October 1962
50 CENTS
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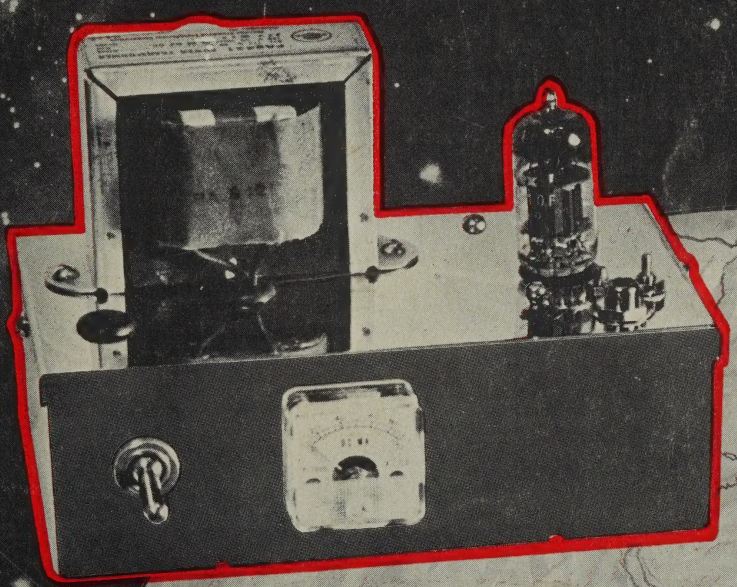
CB HORIZONS

NEW AMPEREX 7788 SPACE AGE TUBE BRINGS 'VASTLY-IMPROVED' CB RECEPTION!



TWO-WAY RADIO FOR BUSINESS AND PLEASURE

IN THIS ISSUE

COMPLETE STEP-BY-STEP CONSTRUCTION DETAILS — SUPER CB PRE AMP

Introduction to Single Sideband for the CB'er • Using CB for Parade Control • A Low Cost VTVM Test Meter for Your Station
CB Makes Polio Vaccine Drive Successful • Part Two — CB Audio

NEW FREQUENCY SYNTHESIZER

With International's new crystal controlled frequency synthesizer you can switch instantly to any one of the 23 CB channels. Each channel uses the same crystal for transmitting and receiving. A 24th position is provided as a spare. Illuminated dial. Self contained power supply. Unit matches Model 100 and Model 50 Executives. Meets FCC requirements for frequency tolerance and spurious radiation.

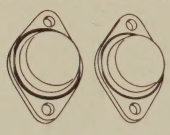
Complete with interconnecting cables and instructions $159.50

NEW MODEL 100 A EXECUTIVE TRANSCEIVER

Now International brings you an advanced design Executive transceiver, for **more reliable mobile operation,** featuring a **transistor power supply, new perforated metal cabinet,** and equipped with a **new rugged dynamic microphone.** This is the latest in the famous line of International Executive transceivers. The first commercially available CB unit to make use of a high frequency crystal filter to achieve and permanently guarantee receiver selectivity for the life of the equipment. Twelve crystal controlled channels. Two crystal controlled receive positions. Dual conversion superheterodyne receiver tuning all 23 channels. Built-in calibration circuit. Transistor power supply operates from 6/12 vdc or 115 vac. Push-to-talk operation. Certified tolerance ± .005%.

Model 100 A, complete with 1 transmit crystal, 1 receive crystal, and microphone.... $199.50

Check these new features.



- **Transistor Power Supply**

- **New Dynamic Microphone**

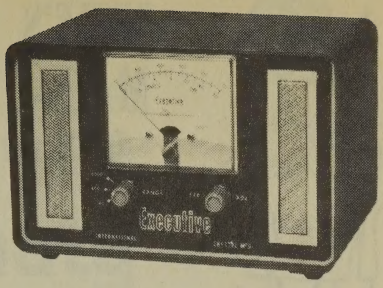
for Outstanding Performance

Citizens Band licensees with International equipped stations know the unquestioned superiority and advantages of Executive transceivers and their system engineered accessories.

EXTERNAL SPEAKER S/METER

The perfect companion for the International Executive Model 100. Utilizes a high impedance vacuum tube volt meter circuit. Connects to socket on rear of transceiver. S/meter reads in three ranges Brown cabinet, brown and silver panel matches Model 100 Executive. Dimensions: 5½" H. x 8½" W. x 7" D.

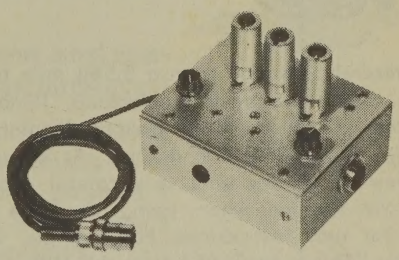
Complete with interconnecting cable....$49.50



EXECUTIVE SPEECH CLIPPER/FILTER AMPLIFIER

A microphone amplifier designed to increase average modulation . . . limits modulation peaks . . . filters audio frequencies above 2500 cycles. Permits arms-length microphone operation. Power requirements: 12 vac or 12 vdc.

Complete with interconnecting cable....$36.50



12.6 VAC, 2 AMPERE POWER UNIT

Base station power unit for Speech Clipper/Amplifier. Operates from 115 vac. Provides 12.6 vac at 2 amperes.

Complete with mounting chassis, power cord, fuse, switch.....$12.50

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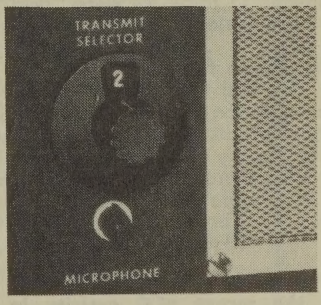
A new 12-position dial, designed and engineered by International as an accessory for the Model 100 Executive transceiver. Illuminated numerals assist in selecting any one of 12 crystal controlled transmit channels. Simple to install. Dial assembly may also be used with any 12-position, 30 degree switch.

Complete with instructions.....$11.25



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OZZIE'S MAIL-BOX

We recently returned from a 5,583 mile trip through the following states: Indiana, Illinois, Minnesota, Wisconsin, North Dakota, Montana, Wyoming, South Dakota and Iowa. As we are fairly new in CB we were very careful about giving our location when trying to make a contact for road instructions. For example, we would say "This is KHG1664 from the 19th district, Warren, Ohio traveling in (District number, name of town and even name of street, if possible), requesting information . . . . " We didn't want anyone to think we were "skip." Of all the miles we traveled, only one CB'er came back to our calls . . . 16W1206 in Bayville, Wisconsin. She was so friendly and did her best to help us . . . we had found a voice out of the darkness! Our question is . . . why were we avoided? In the 19th district we frequently heard CB'ers asked to stop by and even stay the night. The traveling CB'ers are always invited in for a travel break. Why were we ignored?

Tup Timms
KHG1664

Tup:

Apparently the recent FCC activity in the field of Part 19 enforcement has a lot of CB'ers running scared. However, the Commission states, and has always stated, that traveling CB'ers may use their radios to seek road and travel accommodations in strange towns. The method you described for calling is the very one we recommend to CB'ers writing us for advice. All we can assume is that CB'ers in the states you traveled in are not aware of the facts of life!

Ozzie:

My mobile set is a Lafayette HE-20A and I work in a high noise area. Another CB'er told me he saw a couple of modifications in your July issue for improving the HE-20A circuit, one of which was your Makino noise limiter. I borrowed the magazine and tried the circuit out. You can tell the rest of the CB'ers it is tremendous! I also want to build the Bow Tie antenna shown in the July issue. Enclosed is my $4.00. I'm sold on CB Horizons!

Thomas Hart
2Q1473

Tom:

Not everyone had such kind words for the Makino noise limiter circuit. Some HE-20A owners complained that the addition of the circuit fouled up their S meter circuit. Tech Editor Jim Kyle explains how to fix this problem in this issue however.

Dear Ozzie:

Your March issue contained a very nice article using one of our DS-22 Delco transistors as a speech amplifier in the Turner 350C microphone. The DS-22 transistor has been superseded now by our DS-25. You might be interested in knowing that the DS-26 transistor also works very well in this application.

W. C. Caldwell
Supervisor, Field Service
Delco Radio Division
General Motors Corp.

Mr. Caldwell:

If there were ever a construction project that was simple, worthwhile and interesting, Author Jim Gould's built-in mike pre-amp must surely have been it. This quickie by Gould is still drawing several dozen letters a week! Thank you for keeping the CB'ers of America advised of these transistor improvements at Delco.

Dear Ozzie:

I think you are nuts. Anyone who would think of putting Single Sideband on CB has taken leave of his brains. You have only to listen to what has happened to SSB in the ham bands to realize that things would be worse instead of better with SSB on 11 meters. If everyone were an engineer it would work OK, but with the screwdriver happy gang that are now making noises and creating interference on CB, things would get a whole lot worse instead of better. You would do better to ask (the FCC) for a cut in power input and lowering of the antennas if you really want to help cut down the interference. I don't think the pocketbooks of 75% of the CB'ers could stand the cost of doing it any other way. Maybe you want CB reserved for the "got-rocks" gang? This would do it! I hope you choke.

Paul Crowell
19W4898

Paul:

You seem to be rather violently opposed to single sideband operation for CB'ers. Assuming that SSB equipment could sell for the same price range as AM equipment with comparable features, we wonder what your real gripe is? Frankly we believe that SSB has a place in CB, just as it does in all of Uncle Sam's airplanes. Or perhaps you aren't aware that the Airforce has switched to almost 100 percent sideband operation because the Government knows sideband (A) costs less in the long run, (B) is far more reliable than AM, (C) allows far more stations to use the same frequencies at the same time than AM. Let's leave the hams out of this. They are an experimental and pleasure type of radio service. We are a personal and business communications service. And anything which will expedite business and personal communications with greater reliability than the carrier choked 23 channels we have today . . . we are for!

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Fiberglas CB antennas

now you can whip two problems most common to fiberglas antenna performances!

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CB Horizons magazine serves more than 74,000 CB radio enthusiasts every month, covering all 50 states, Puerto Rico, Canada, U.S. Possessions and 19 Central and South American countries where 27 mc transceivers are in use. Circulation is through the mails, and "over-the-counter" at more than 500 CB dealers throughout the United States, Canada and South America.

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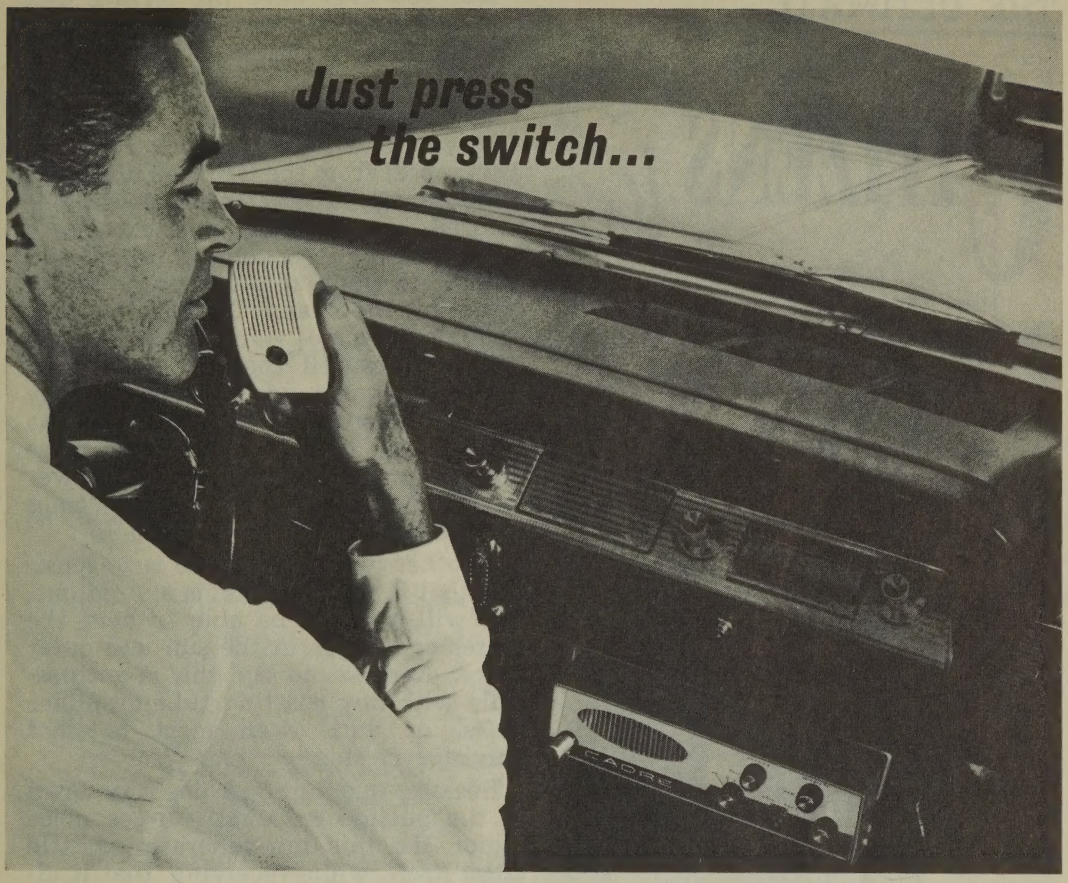
COVER: Here it is! The space-age CB pre-amplifier to end all pre-amps. The new Amperex 7788 tube has been developed into a super-hot CB receiver amplifier in the CB Horizons lab. Read all about what it does and how to build it starting on page 8.



you're "on-the-air" with this powerful transistor CB 2-way radio

New Cadre '510' 5-watt, 5-channel Transceiver

Highest Power Allowed • Excellent Selectivity
Solid-State Throughout • Maximum Reliability

When you press the switch you're on-the-air with the cleanest 27Mc "talk" power possible — 5-watts. You can reach vehicles and base stations instantly . . . dependably . . . up to 20 miles over land, 30 miles over water. 5 crystal-controlled transmit/receive channels assure perfect contact every time.

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Release the switch—you're still on-the-air. (Don't let the silence fool you! Adjustable squelch shuts out extraneous signals for noise-free standby reception.) The sensitive receiver circuit — a dual-conversion superheterodyne — captures weakest signals, and reproduces them with crisp, clear intelligibility. No adjacent channel interference. Highest selectivity with tuned ceramic filters. Electrical interference virtually eliminated with the '510's' effective automatic noise limiter.

MOST RELIABLE — 100% SOLID-STATE DESIGN

Whether pressing or releasing the mike switch, you're controlling the most reliable, maintenance-free Citizens Band transceiver. It's completely transistorized — 18 transistors, 8 diodes. Keep it "ON" safely all day—no heat problems, no tubes to burn out and replace, lowest current drain prolongs vehicle battery life. Solid-state components absorb road punishment without damage.

MOST COMPACT — EASIEST TO INSTALL

The smallest, full-power Citizens Band transceiver is easiest to install. Its 3⅛" height never steals leg room in a vehicle; fits smartly under the dash of the smallest foreign compact. And it can be used anywhere — vehicle, base station, field, marine craft. A dual-power supply — 12VDC/110-220VAC — is built right into the Cadre '510'. Add a portable pack accessory (model 500-1) with rechargeable batteries and you have the lightest, portable 5-watt radio (9½ Lbs. with batteries) for pleasure, or business.

Cadre '510' complete with dynamic microphone, set of matched Channel 11 crystals, universal mounting bracket, AC & DC cords . . . $199.95.

See the nearest Cadre distributor for a free demonstration, or write:

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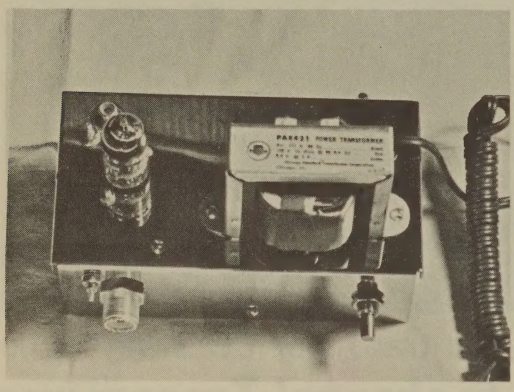
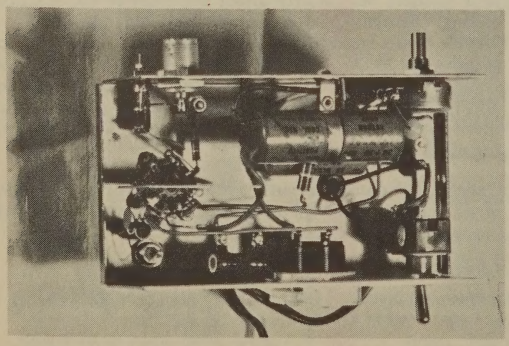
THE ULTIMATE

CITIZENS BAND



PRE AMP



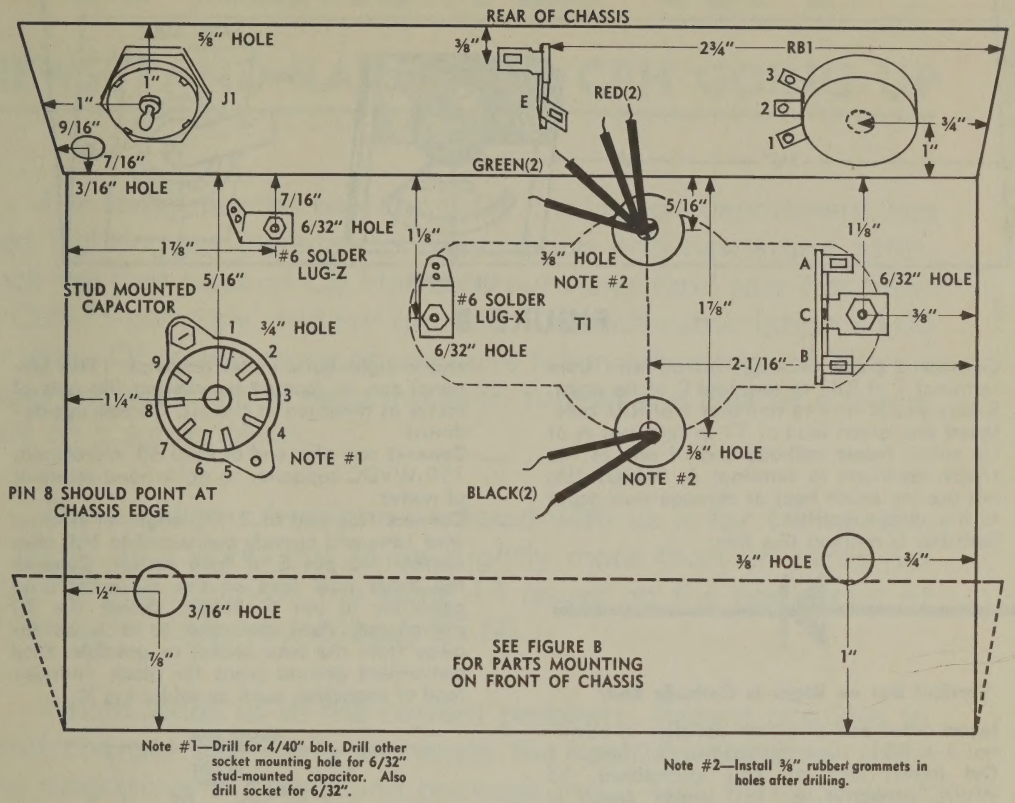
Did you ever have the feeling that if you could dig down just a little further into the noise of your transceiver you would find greatly increased base-to-mobile range?

If you have, then this is for you! This report from the CBH lab describes a missile age tube (the Amperex 7788) utilized in a narrow-band extremely low noise, high gain circuit which will deliver to your speaker every bit of signal on the channel. With this pre-amplifier ahead of your transceiver you can rest assured that the only item limiting how far you are able to copy "the weak ones" is (a) your antenna system, and (b) the background noise always present from nearby power lines and the very noise of the cosmos themselves.

In other words, this tube is so sensitive that if your location is a quiet one, you will actually be able to hear the noises coming from the sun and outer space. Needless to say, this is *not* possible with any existing tube amplifier units, *or* with even most hot-shot Nuvistor rf stages.

Because this unit operates way down in the outside external sources noise region (i.e. this unit generates so little noise itself, while receiving, that it allows you to hear the previously mentioned noise from outer space and local power lines), you can rest assured that here at last is an "ultimate pre-amplifier" for the ardent CB buff. Until we find a way to shut out power line noise and the noise from outer space itself, the 7788 tube will be the best you can obtain. With this working limitation, it's apt to be around a long-long time!

Oh, it's not an inexpensive tube we found. For its $11.00 price, it is a quality tube with an expected 10,000 HOUR life. That's a mighty long time. A 7788 pre-amp built in the Horizons Lab really souped things up, so we tore it down and rebuilt it again, describing while we did the complete step-by-step process required to put it together. This was done to make building one of these pre-amps fun (and easy!) for those who want extra performance, but don't have a technical background.



Note #1—Drill for 4/40" bolt. Drill other socket mounting hole for 6/32" stud-mounted capacitor. Also drill socket for 6/32".

Note #2—Install ⅜" rubber grommets in holes after drilling.

FIGURE A

CONSTRUCTION

Right off the bat we hit the problem corner. The power requirements are just high enough that it isn't practical to use the pre-amp in a mobile. OK, so back to the original discussion of using it with the base station. Putting the unit together is relatively simple IF you follow the instructions closely.

PROCEDURE

___ Drill all holes and **mount** parts as shown in figures A and B, all except meter (M1).

___ **Cut** a 2" x 1½" shield. (Use sheet brass or copper, available from sheet metal shops.)

___ **Bend** tube socket pins 1, 3, 5, 8, down to socket mounting ring. **Remove** metal post from center of tube socket with pliers.

___ **Lay** 2" x 1½" shield across pins 3 and 8 being careful to center shield across socket. **Solder** shield to pins 3 & 8 making sure solder flows on to socket mounting ring. Also **solder** pins 1 & 5 to mounting ring. (Narrowest part of shield should be mounted in vertical plane and widest part across socket.)

___ **Bend** pin 9 down as close to 6/32" stud mounted capacitor as possible. **Bend** capacitor solder lug over to meet pin 9. Solder.

___ **Cut** leads on 47,000 ohm resistor (Yellow-Violet-Orange) to ¼" & ⅜" lengths. **Make hook** in end of ⅜" lead.

___ **Cut** leads on 27,000 ohm resistor (Red-Violet-Orange) to ⅜" & ½". **Make hook** in end of ⅜" lead.

___ **Join** 27,000 & 47,000 ohm resistors by hooks. Orient resistors so they are at right angles to each other.

___ **Cut** leads on a .001 ceramic capacitor to ¼" & ⅛". **Make hook** in end of ¼" lead. Join hook to junction of 27,000 & 47,000 ohm resistors. **Solder.**

___ **Connect** ¼" lead of 47,000 ohm resistor to pin 2 of tube socket. Connect ⅛" lead of .001 ceramic capicitor (installed at junction of resistors) to solder lug Z. Solder. See Figure C.

___ **Cut** black transformer leads (T1) to 2" length. **Strip** and **solder** one lead to tie point connection B (nearest switch SW1) and the other one to top terminal of SW1.

___ **Cut** one red & both green transformer leads to 2" length.

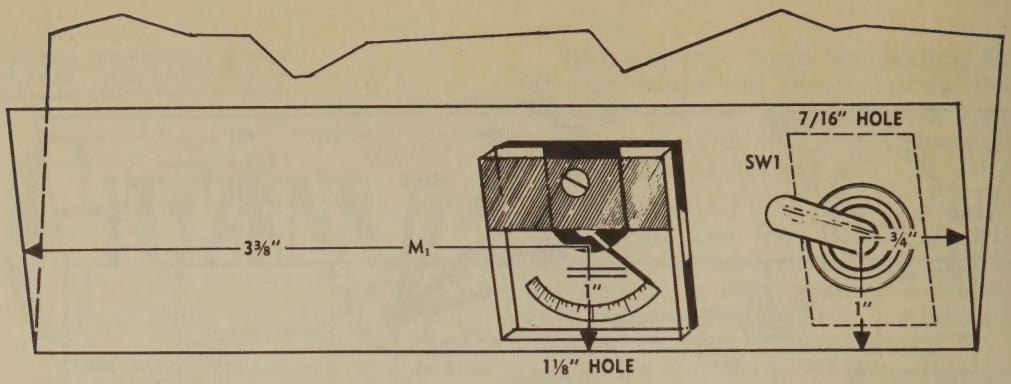
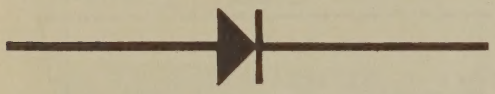


FIGURE B

— **Connect** a piece of #22 hookup wire from terminal 1 of RB1 to terminal C of tie point. **Solder** end of wire to terminal 1 of RB1 only.

— **Insert** one green lead of T1 in terminal A of tie point. **Insert** cathode end of one of the silicon rectifiers in terminal A. **Solder.** (Do not use too much heat or damage may occur to the silicon rectifier.)
Rectifier is marked like this:



Vertical Bar on Right is Cathode End.

— **Insert** other end of silicon rectifier in terminal 3 of RB1. (Cut this lead to ¾" length.) **Cut** minus lead of 250 microfarad, 15 WVDC capacitor to 1½" length. **Insert** in terminal 3 of RB1. Solder. **Cut** plus end of capacitor to ¾" length. **Insert** in solder lug X.

— **Cut** piece of #22 hookup wire to 5¾" length. **Strip** and **solder** one end to pin 4 of tube socket along with one lead of a .001 ceramic capacitor. (Cut capacitor leads to ¼" length.) **Solder** free end of capacitor to socket mounting ring. **Solder** free end of hookup wire to terminal A of tie point.

— **Insert** 2" red lead of T1 & remaining 2" green lead of T1 in terminal C of tie point. **Solder.**

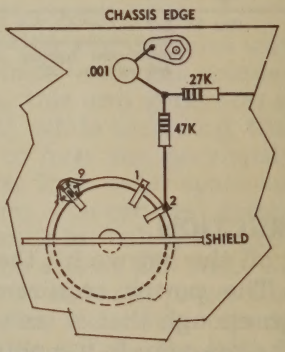
— **Cut** remaining red lead of T1 to 1½" length. **Cut** cathode end of second silicon rectifier to ⅜" length. **Form hook** in this end. **Cut** one end of 100 ohm resistor (Brown-Black-Brown) to ⅜" length. **Make hook** and **join** with cathode end of silicon rectifier. **Solder.** (Do not use too much heat.) **Connect** red lead of T1 to tie point connection E. **Cut** free end (opposite cathode end) of silicon rectifier to ⅜" length and connect to tie point connection E. **Solder.**

— **Cut** free end of 100 ohm resistor to ¼" length. **Form hook** in this end. **Cut** piece of #22 hookup wire to 2¼" length. **Strip** ends, **form hook** in one end. **Connect** to hook on 100 ohm resistor. **Solder.** Install meter M1.

— **Drill** 6/32" hole adjacent to pin 6 of tube socket. **Install** 6/32" stud-mounted capacitor. **Connect** capacitor to pin 6. **Cut** leads on 5 watt, 1000 ohm resistor to ⅞" and 1½" length. **Connect** ⅞" end to pin 6 & other end to right-hand meter terminal. (This terminal can be located by viewing the rear of meter as mounted in chassis. Chassis upside-down)

— **Connect** one plus end of dual 30 microfarad, 150 WVDC capacitor to right-hand terminal of meter.

— **Connect** free end of 2¼" length of hookup wire (one end already connected to 100 ohm resistor) to pin 6 of tube socket. **Connect** the other plus lead of the 30 microfarad capacitor to pin 6. Solder. **Orient** the 30 microfarad, dual capacitor so it is as far away from the tube socket as possible. Find convenient ground point for black (minus) lead of capacitor, such as solder lug X.



7788 Socket Area Wiring

— Cut the ends of a .001 ceramic capacitor to ¼" length. Form hook in one end. **Connect** to free end of 27,000 ohm resistor. **Connect** other end to solder lug X. **Connect** 3¼" piece of #22 hookup wire to free end of 27,000 ohm resistor. **Solder. Connect** other end of hookup wire to terminal 2 of RB1. **Solder.**

— **Select** one of the two coil forms. **Wind** 11 turns of #24 enamel covered wire on the form, starting at the open end. See Figure D. **Wind** a 2 turn coil on the end nearest the threads on the form. Space windings as close together as possible. End B of two turn winding should be left ⅞" long, end C should be cut to ⅜" length, bent down and soldered to the coil form mounting ring. **Mount** coil form in hole near lower left hand side of J1. Connect a piece of #22 hookup wire

(Continued Page 38)

50 CENTS PER COPY

NEWSSTAND RATES FOR CBH GOING UP

For some months now the CBH circulation department has been fighting an increase in subscription and newsstand rates. Since the first issue of CB Horizons our newsstand rate has been 40 CENTS per copy, and our annual 12 month subscription $4.00 per year. Of course many of you have taken advantage of "Bonus Issues" offers thereby reducing even further the cost of a single issue on a subscription.

The average subscription entered with us is for 14 months. At $4.00, this works out to be slightly more than 28 cents per issue. If you purchase the same 14 issues on the newsstand at 40 cents per copy, you will pay $5.60.

Which leads us to the current problem. Recent changes in postal charges materially increases the costs involved for shipping magazines in single and package lots. And, the growth of CB Horizons from its original 40 pages to nearly 60 (and in some months up to 80) also increases the amount of postage applicable to each copy mailed. **End result?**

CB Horizons newsstand price must increase to **50 CENTS per copy** to stay up with increasing costs. This amounts to $7.00 for the same 14 issues. **Now,** clearly, **would be an excellent time to subscribe** at the ridiculously low rate of 28 CENTS per issue!

BECAUSE . . . .

Sometime within the next 30-60 days we will be forced to raise our yearly subscription rate to $5.00 per year. Blame the post office though . . . . **not** us!

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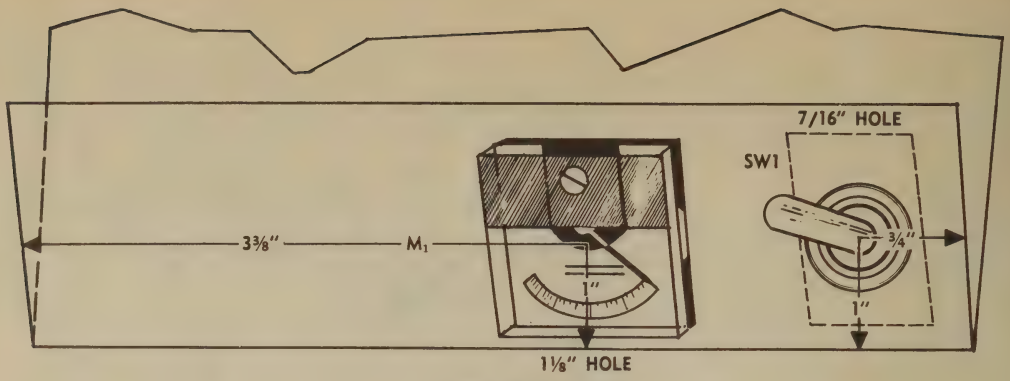


FIGURE B

— **Connect** a piece of #22 hookup wire from terminal 1 of RB1 to terminal C of tie point. **Solder** end of wire to terminal 1 of RB1 only.

— **Insert** one green lead of T1 in terminal A of tie point. **Insert** cathode end of one of the silicon rectifiers in terminal A. **Solder.** (Do not use too much heat or damage may occur to the silicon rectifier.)
Rectifier is marked like this:

Vertical Bar on Right is Cathode End.

— **Insert** other end of silicon rectifier in terminal 3 of RB1. (Cut this lead to ¾" length.) **Cut** minus lead of 250 microfarad, 15 WVDC capacitor to 1½" length. **Insert** in terminal 3 of RB1. Solder. **Cut** plus end of capacitor to ¾" length. **Insert** in solder lug X.

— **Cut** piece of #22 hookup wire to 5¾" length. **Strip** and **solder** one end to pin 4 of tube socket along with one lead of a .001 ceramic capacitor. (Cut capacitor leads to ¼" length.) **Solder** free end of capacitor to socket mounting ring. **Solder** free end of hookup wire to terminal A of tie point.

— **Insert** 2" red lead of T1 & remaining 2" green lead of T1 in terminal C of tie point. **Solder.**

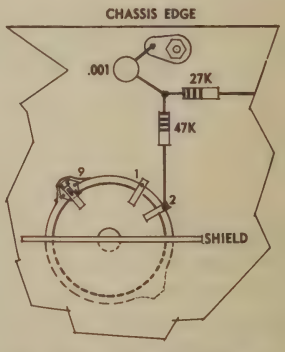
— **Cut** remaining red lead of T1 to 1½" length. **Cut** cathode end of second silicon rectifier to ⅜" length. **Form hook** in this end. **Cut** one end of 100 ohm resistor (Brown-Black-Brown) to ⅜" length. **Make hook** and **join** with cathode end of silicon rectifier. **Solder.** (Do not use too much heat.) **Connect** red lead of T1 to tie point connection E. **Cut** free end (opposite cathode end) of silicon rectifier to ⅜" length and connect to tie point connection E. **Solder.**

— **Cut** free end of 100 ohm resistor to ¼" length. **Form hook** in this end. **Cut** piece of #22 hookup wire to 2¼" length. **Strip** ends, **form hook** in one end. **Connect** to hook on 100 ohm resistor. **Solder.** Install meter M1.

— **Drill** 6/32" hole adjacent to pin 6 of tube socket. **Install** 6/32" stud-mounted capacitor. **Connect** capacitor to pin 6. **Cut** leads on 5 watt, 1000 ohm resistor to ⅞" and 1½" length. **Connect** ⅞" end to pin 6 & other end to right-hand meter terminal. (This terminal can be located by viewing the rear of meter as mounted in chassis. Chassis upside-down)

— **Connect** one plus end of dual 30 microfarad, 150 WVDC capacitor to right-hand terminal of meter.

— **Connect** free end of 2¼" length of hookup wire (one end already connected to 100 ohm resistor) to pin 6 of tube socket. **Connect** the other plus lead of the 30 microfarad capacitor to pin 6. Solder. **Orient** the 30 microfarad, dual capacitor so it is as far away from the tube socket as possible. Find convenient ground point for black (minus) lead of capacitor, such as solder lug X.



7788 Socket Area Wiring

— Cut the ends of a .001 ceramic capacitor to ¼" length. Form hook in one end. **Connect** to free end of 27,000 ohm resistor. **Connect** other end to solder lug X. **Connect** 3¼" piece of #22 hookup wire to free end of 27,000 ohm resistor. **Solder. Connect** other end of hookup wire to terminal 2 of RB1. **Solder.**

— **Select** one of the two coil forms. **Wind** 11 turns of #24 enamel covered wire on the form, starting at the open end. See Figure D. **Wind** a 2 turn coil on the end nearest the threads on the form. Space windings as close together as possible. End B of two turn winding should be left ⅞" long, end C should be cut to ⅜" length, bent down and soldered to the coil form mounting ring. **Mount** coil form in hole near lower left hand side of J1. Connect a piece of #22 hookup wire

(Continued Page 38)

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The average subscription entered with us is for 14 months. At $4.00, this works out to be slightly more than 28 cents per issue. If you purchase the same 14 issues on the newsstand at 40 cents per copy, you will pay $5.60.

Which leads us to the current problem. Recent changes in postal charges materially increases the costs involved for shipping magazines in single and package lots. And, the growth of CB Horizons from its original 40 pages to nearly 60 (and in some months up to 80) also increases the amount of postage applicable to each copy mailed. **End result?**

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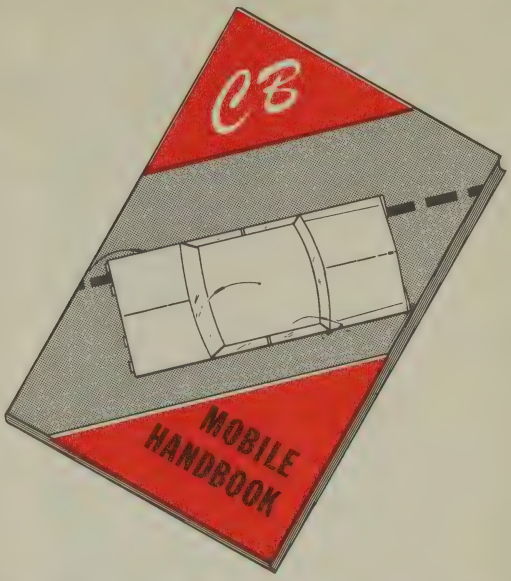

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A Look At The Future

SINGLE SIDE BAND AND THE CB'er

– Staff –

To most CB radio operators, the phrase *single sideband* probably means little. Those CB'ers somewhat familiar with today's modern communication's advances may have a basic grasp of what single sideband (SSB) is and what it does. The majority do not.

To be prejudiced against SSB is to show a basic mis-understanding as to what SSB is.

Single sideband is defined by the FCC is the same phrase that defines standard AM (amplitude modulation). See special box insert on page 48. There is no question what-so-ever as to the legality of SSB. To question its status is to show further mis-understanding as to both what it is, and what it isn't.

SO WHAT IS IT?

Single sideband transmission and reception *is* a superior means of carrying intelligence. It does not outmode AM or FM. Each have distinctive advantages over SSB. However, these advantages are not necessarily important in point-to-point or mobile-to-mobile communications. In fact, many will tell you that the advantages of AM (and to a certain extent FM) are actually disadvantages for the type of radio service we have with CB.

A simplified explanation of SSB would involve the basic principles of both AM and SSB. When you add voice power to a carrier generated in a standard AM transmitter, two "audio sidebands" develop (Diagram 1). These sidebands are the sum and difference frequencies, plus and minus the frequency of your carrier (for example 27.085), with your audio frequencies added or subtracted from your carrier frequency.

In other words, our channel 11 frequency is 27.085 megacycles. By adding a simple 1,000 cycle audio tone (refer to last month's September issue of CBH, "A CB'ers Audio") from a tone generator or some other audio source, we immediately have three frequencies transmitting from the transmitter. One is the 27.085 carrier frequency. Another is 27.086 (1,000 cycles or 1 kc-the audio frequency-above the carrier) and yet another is 27.084 (1,000 cycles or 1 kc-the audio frequency-below the carrier).

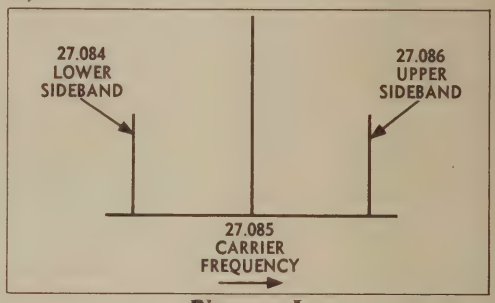
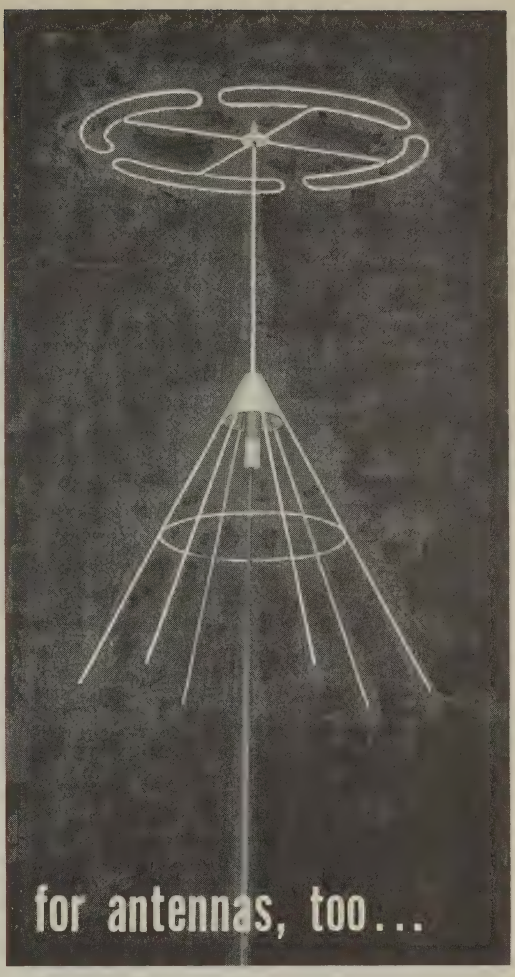


Diagram 1

Why do we have these three frequencies? Because, simply, the final stage in your transmitter does two things. First of all it develops a 5 watt input signal. Secondly, it acts as a *meeting ground* for your 5 watt frequency controlled signal (which begins with the crystal in the transmitter oscillator stage) *and* the audio you develop in your modulator when you speak into the microphone. Your audio is added or applied to the transmitter carrier in the final. The transmitter final amplifier is already on our example frequency of 27.085, or channel 11. The voice power from you, however, is in the human speech range, or 300-3000 cycles (.00003 to .0003 mega-



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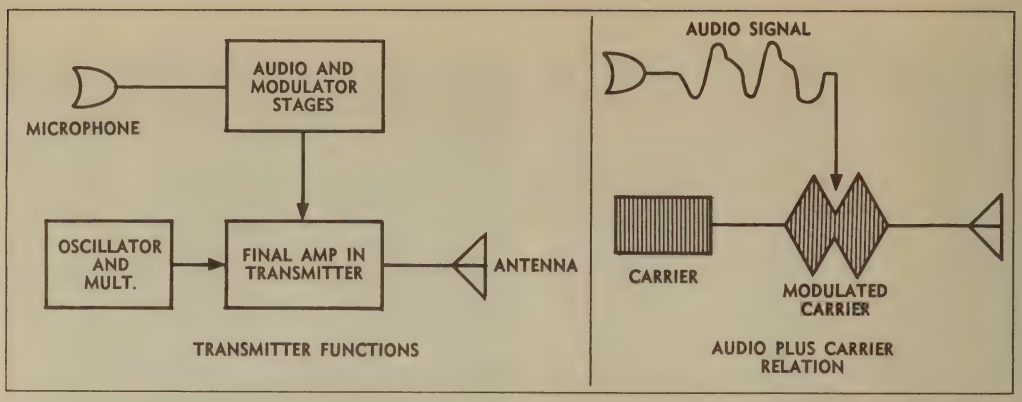

Diagram 2

cycles). The 27.085 mc signal and the audio signal mix together in the final amplifier stage. The audio voice frequencies add to and subtract from the carrier frequency at a rate which varies with the changes in the voice speaking into the microphone (Diagram 2).

In single sideband operation, we take advantage of the fact that it is not the carrier which contains the intelligence (i.e. the voice) but rather it is the sidebands which are actually displaced from the carrier frequency by an amount equal to the frequencies in our voice.

The carrier then is actually nothing but that—a carrier. *And yet it does not carry anything!* For once we have established the frequency of our transmitter with the carrier, *and* mixed our voice intelligence with that frequency thereby developing our sum and difference frequencies, the carrier per se is of no more use to us *until* the signal arrives at the receiver. The carrier, then, is not needed to transmit our voice through space. It is only needed to develop the proper transmitting frequency for our signal.

So let's get rid of the carrier. We will simply "filter it out" of our output, leaving our two sidebands (which are called upper and lower respectively). Filtering of the carrier is done by one of a number of electronic methods which we will touch briefly on in another installment of this series.

With the carrier gone, after electronic filtering, we have two sidebands left. Each one, however, contains the *same* exact intelligence. Each has everything we say. So why *not* get rid of one of these? We'll explain *why* shortly. Once again we employ a bit of electronic filtering and eliminate one of the two sidebands. Which one we eliminate matters little, as long as other users of this type of transmission are agreed on which one we will eliminate, and which one we will use. There is no technical advantage or reason to using one over the other since both are identical. Most systems on other frequencies keep the upper sideband, so we will too. (Diagram 3)

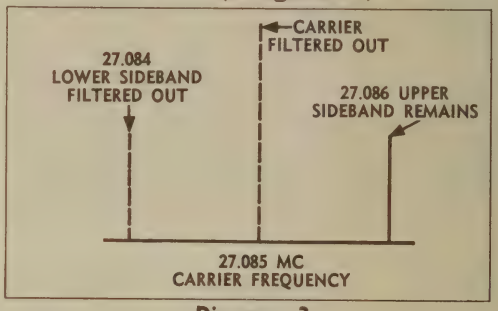

Diagram 3

What have we gained by filtering out first the carrier and then one of the two sidebands? In its simplest form, we have gained 9 db. Or, to put it another way, we have increased our effective transmitter output by 8 times. This is assuming that we are still operating at the 5 watt level.

Why have we gained this power advantage by using single sideband instead of AM? And how can we *still* run 5 watts, and yet increase our effective power to 40 watts?

Here the theory gets a little sticky for the newcomer. Let's boil it down *this* way. Your 5 watts previously in use with amplitude modulation was spread over three areas . . . i.e. the

(Continued Page 45)

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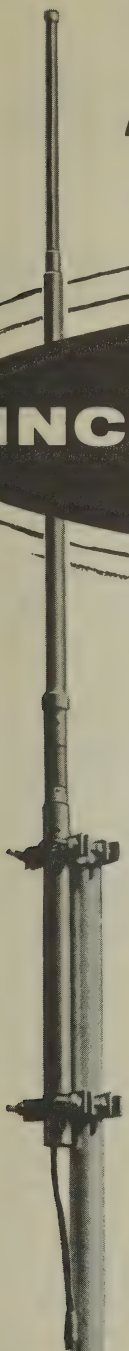

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A Handy Accessory

UNIVERSAL S-METER

FOR CB TRANSCEIVERS

– Jim Kyle, CBH Tech Editor –

Quite a few CBH readers have asked us how to attach an S-meter to their individual kind of transceiver.

Here's a **universal** S-meter which you can add to any set (except those with superregen receivers). Total cost is less than $10.00 and it shouldn't take you more than one evening to put together. The entire unit can be built in a small metal box, "outboard" to the transceiver—or it can be built into many sets.

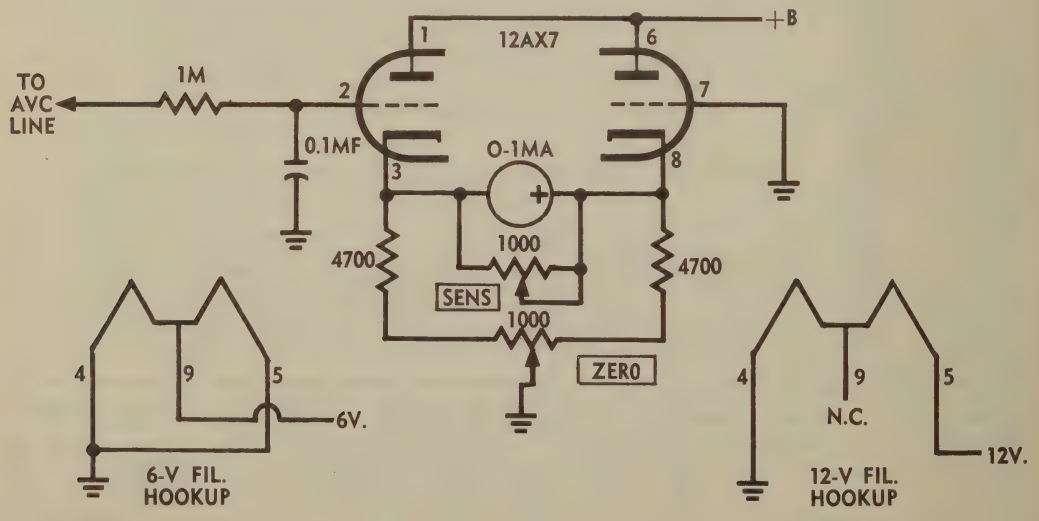
Only four connections need be made to the wiring of the transceiver—and three of these are for power. If you follow instructions closely, addition of the S-meter should not affect performance of the transceiver in any way.

The circuit consists of a basic VTVM, connected so as to measure the AVC voltage developed in the receiver by the incoming signal. It features controls to set the meter to read properly at each extreme of its range; in-between readings are automatically made correct by the special meter scale (if you use the specified meter).

The main part of the circuit is built on a Vector 9-pin turret socket. First, find out if you want to use the 6-volt or the 12-volt filament hookup, and wire pins 4, 5, and 9 of the tube socket according to the schematic diagram for the hookup you choose.

Next, connect pins 1 and 6 together (use insulated wire) and run a lead of No. 20 red stranded wire from pin 6, long enough to reach the B+ tap-off point you're going to use in the transceiver.

Connect a 4,700-ohm, ½-watt resistor from pin 3 to one of the turret lugs. Do the same at pin 8. Extend insulated leads about 6 inches long from pins 3



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and 8 (these will later connect to the meter) and solder the joints.

Ground pin 7, and connect a 0.1-mf capacitor from pin 2 to ground. Also, connect one end of a length of shielded cable to pin 2 (center conductor) and ground the shield. The 1-megohm resistor shown in the schematic will be installed in the set as one of the final steps.

Pick the place you want the meter and cut the proper size mounting hole. Then install the meter. On the back of the panel (if you're building this into your set) or on the inside of the chassis (if it's outboard) attach a small piece of aluminum about 2 inches wide by 4 inches long with one long edge bent over for an attaching lip. Drill two ⅜-inch holes in this sub-panel for the two adjustment potentiometers—making sure that the holes are spaced far enough apart for both pots to be attached.

Now, install the pots. Mark one of them "SENS" and the other "ZERO" to identify them for adjustment later. Connect the center terminal of the "SENS" pot to either of the outside terminals; then connect one outside terminal to one meter terminal and the other to the other.

Take the lead from tube pin 8 and connect it to the meter terminal marked "+"; the lead from pin 3 goes to the other meter terminal.

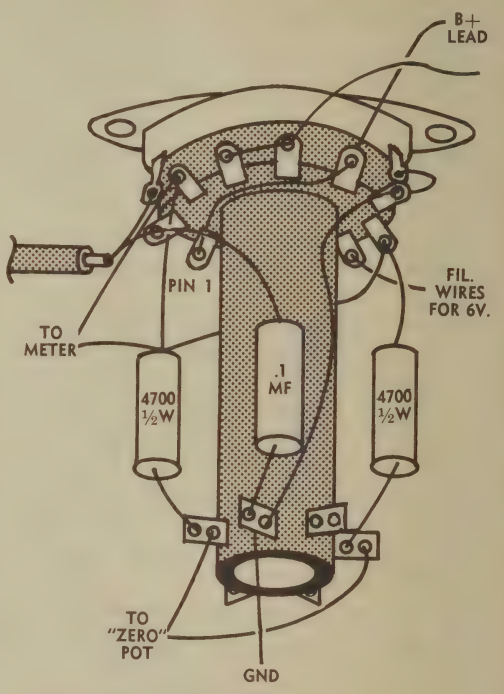
Now run leads from the free ends of the two 4,700-ohm resistors to the two outside terminal of the "ZERO" pot; ground the center terminal of this pot.

In the transceiver, locate the AVC line. This usually will be a black or green wire, leading to one terminal of each IF transformer. DO NOT USE THE RED WIRE WHICH ALSO RUNS TO EACH IF TRANSFORMER. Connect one end of the 1-megohm resistor to the AVC line and the other end of the resistor to the inner conductor of the shielded cable which runs to pin 2.

Connect the filament and B+ wires to any point in the transceiver which will give you the proper voltages. Check out the wiring to make certain it's correct, plug in a type 12AX7 tube, and you're ready to line it up.

Turn on the transceiver and let it warm up. After the set is warm, the S-meter needle may be either off the scale to the left, to the right, or indicating at random. Remove the antenna and short out the antenna input connector of the CB unit, then zero the needle with the "ZERO" adjustment. Remove the short and replace the antenna.

Now, tune to a strong signal. If you have another rig available, put it on a dummy load and use its output. At this stage, you want the strongest signal



PARTS LIST

1—type 12AX7 tube
1—9-pin Vector turret socket
2—1,000-ohm type AB linear taper potentiometers
2—4,700-ohm ½-watt composition resistors
1—0.1 mf 200 VDC capacitor
1—1-megohm ½-watt composition resistor
shielded cable
red stranded hookup wire
chassis, case, solder, etc.
1—Lafayette type TM-11 S-meter (0-1 MA scale)

you'll ever hear. The needle will probably go off the scale to the right. Bring

(Continued Page 57)

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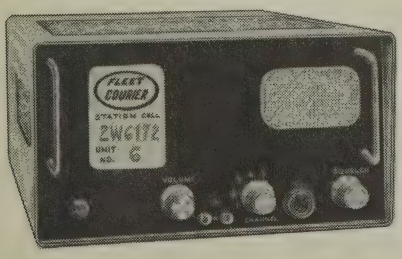

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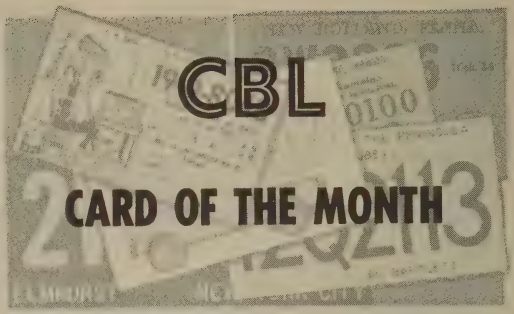
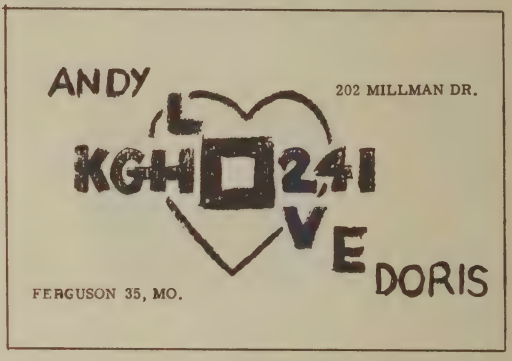


This month's card winner used more than a little imagination to come up with a very cute card.

From a professional layout and printing standpoint, the card is not A-1 quality. But in the idea department, it is A-plus all the way!

Andy and Doris Love were assigned the call-sign KGH0241.



The "0" in KGH0241 has been enlarged to form the "O" in Love. And the entire center section of the card encircled with a heart.

Oh yes . . . Andy and Doris obviously have something other than their call letters in common!

The red on orange card earns a 6 month subscription extension to CBH for KGH0241.

How about sending along your card? It may be good enough to capture the attention of our judges and win you a six month extension on your CBH subscription.

Drop your cards (in an envelope please, the post office is pretty rough on cards) to "CBL Contest, P. O. Box 1557, Oklahoma City 1, Oklahoma."

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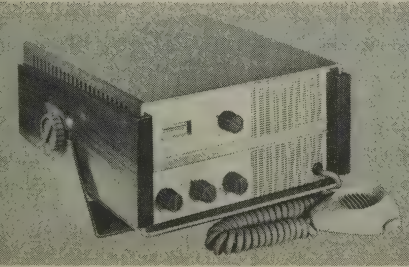

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A SERIES OF IN DEPTH REPORTS ON CB'ERS ACTIVITIES FROM COAST TO COAST.

CB JOINS THE FIGHT AGAINST POLIO IN HOUSTON

July 29 was a red letter day for the *Volunteers Emergency Radio Communications Organization* (VERCO) in Houston, Texas.

The CB'ers of this Texas city made their communications service available to the area's "Victory Over Polio" campaign in a most unusual and dramatic effort which caught the fancy of the entire city.

VERCO members established a central radio dispatching station in downtown Houston where shut-ins in the Houston region could call-in and report "we would like to have the oral vaccine delivered to our home . . ."

VERCO Radio Central. Standing, Jack Vanderslice (9Q0325) spots a dispatch point while Buster Hill (9Q0088), right, and operator J. A. "Al" Pruett (9W0769) keep the operation running smoothly.

From the telephone call messages VERCO mobiles, previously assigned to certain areas in Houston, were directed by the central dispatch station to the homes of the shut-ins. The mobiles worked with teams of nurses who moved around the city after receiving direction from VERCO central.

When the day was finished and the Sunday Victory Over Polio campaign completed, VERCO members could proudly point to 772 living examples who received the oral polio vaccine because VERCO was on the job to provide communications to the medical teams assigned to administer the drug.

Jack Kern, VERCO
9W2014

PARADE CONTROL VIA CB IN RACINE

For the second straight year, mobile units of the Racine Citizens Band Club provided communications for the 4th of July Goodwill Parade. The Goodwill celebration, which is quite famous in the midwest, was begun in the depression years to offset the "bad will" which was generated by the atmosphere of poor labor-management relations in the city at the time.

As the parade route is rather lengthy, difficulties have occurred in past years keeping the parade flowing at an even rate without bottlenecks caused by traffic tie-ups and gaps caused by lagging cars and participants.

This year 14 mobile units of the Racine C.B. Club were stationed every few blocks along the parade route along with a roving tractor unit and a police dispatcher unit. With the effective communications system provided via CB, if a float broke down, the accident was promptly reported to the Parade Marshal via radio, and help was quickly dispatched to the ailing unit. One of the biggest advantages of stationing the CB

Roger Tischendorf, 18A8858, Racine Club Prexy signals the passing of a float unit as Cliff Raney (right) prepares to mount the CB equipped tractor to run along with the parade units. Raney's tractor unit was equipped with headphones to keep outside noise from interfering with his business!

units along the parade route was that it allowed the policemen on foot with the parade to call into police headquarters via CB. They found this much more convenient than fighting through a crowd to a call-box.

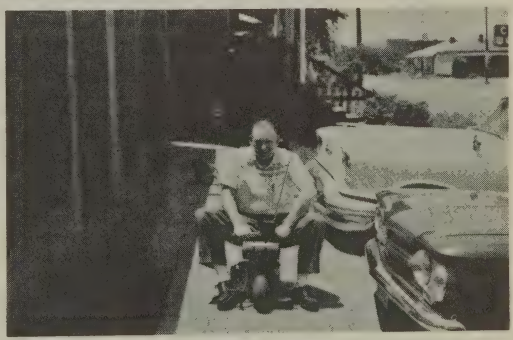
One officer at a northside intersection requested a rescue squad for a marcher who suffered a heart attack while in the parade. Via CB radio the rescue boys were on hand and giving aid in 3 minutes flat!

During the July 4th evening hours CB units with the aid of hand-held units helped with the coordination of the fireworks display.

Donald Jensen
Racine, Wisconsin

TRULY—THIS MUST BE THE SMALLEST!

Reader Joe Baker of Nelco Service Company, Birmingham, Alabama is pretty adamant about his pet CB mobile unit. He calls it the Chihuahua mobile! Baker's rig consists of a "very small" (look carefully — that's a motorscooter!) two wheeler equipped with a Lafayette HE-29A Walkie-Talkie (r). What's more, the rig has real practical uses. Joe's company specializes in the installation of P.A. and music systems. Joe says that C. W. "Bill" Cox, Jr., his partner, shown on the scooter, actually uses the rig to get about the job when they are wiring a large building. A scooter smaller than this, equipped with CB, would have to carry midgets only!



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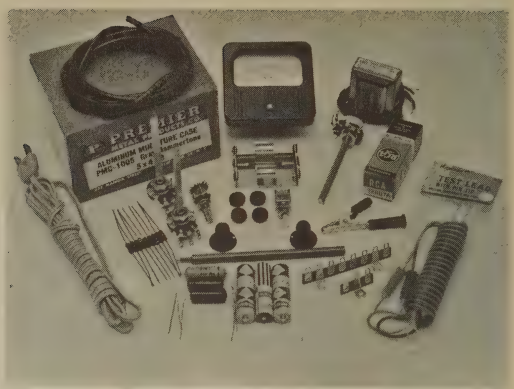
CB Test Equipment

THESE PARTS BUILD



One of the most useful items of equipment in any trouble-shooter's tool kit is a vacuum-tube voltmeter, or VTVM.

Unlike the conventional volt-ohm-milliammeter (VOM), the VTVM can be used to measure voltage on receiver AVC lines and at the grids of transmitting tubes without causing the circuit to quit working. In addition, it allows more accurate resistance readings.

A number of excellent VTVM's are available in kit form, but all share one disadvantage: they are somewhat large for a compact tool kit.

The CBH VTVM uses a simplified—but similarly performing—circuit to allow the entire instrument to be put into a 3x4x5-inch case; this is the same size as the power meter described in July, and only about half as large as kit-type instruments.

Construction of this instrument is simple, but since it is packed tightly into a small space you will find it takes a little time. Allow about a week's worth of evenings, and you'll end up with an accurate instrument you will be proud of. If you try to rush it, you're likely to find a number of wrong connections.

Before we go into the construction details, here are a few words on how it works:

The two halves of the 12AU7 twin-triode tube are connected in almost-identical fashion except that one grid is grounded while the other is connected (through a voltage-divider network adjusted by the RANGE switch) to the voltage to be measured.

The cathodes of the tube go through the opposite halves of ZERO potentiometer to ground. Thus, if the voltages at the grids are the same the cathode current will be the same, and if the grounded arm of the ZERO pot is at the exact midpoint of its range no voltage will exist between one cathode and the other.

In this case, the meter connected between the two cathodes will indicate "zero current".

If a positive voltage is applied to the measuring grid, though, more current will flow through this half of the tube and the voltage at its cathode will rise above that at the other cathode. The meter will then indicate a current flow.

The two 1,000-ohm calibrating pots in the meter circuit are adjusted so that the meter indication shows the voltage applied at the test probe.

The point by which this circuit differs from kit-type instruments is in the use of AC instead of DC on the plates of the tube.

Conventional circuits use DC on tube plates at all times. However, in a VTVM there is no need for this, since the only thing we're really interested in is the *difference* in cathode current between the halves of the tube.

Omitting the conventional power-supply circuit, thus, means no change in performance but it does eliminate half the normal components—and lets us put the instrument in much smaller space.

The voltage divider is conventional; the resistors are chosen so that the voltage at each tap is either 1/10, 1/100, or 1/1000 of that applied to the input (actually, the fraction figures out considerably different from an even multiple of 1/10—this is necessary to keep the instrument operating properly).

THIS VTVM

The ohmmeter circuit also makes use of a voltage divider. Voltage from the 4.5-volt battery in the instrument is applied through a reference resistor to the grid of the "measuring" tube. The reference resistor makes up the upper half of the voltage divider, and the unknown resistance being measured makes up the the lower half. Thus, the voltage actually present at the grid depends entirely on the value of the unknown resistance (if it is equal to the reference resistor, the voltage will drop to 2.25 volts and the meter will read half-scale, etc.).

Enough theory. Let's get to work.

Begin by laying out the chassis box as shown in Figure 1 and drilling and punching all holes. Cut and drill the subchassis as shown in Figure 2. This subchassis is a necessity if you intend to keep the same small size; if you find this a bit too cramped, you can use a larger box. Just keep the same relative parts positions. Cut the shafts of the three potentiometers to ¾" length.

If you want to use the special meter face, have it photocopied to size and glue it into the meter. Details of this

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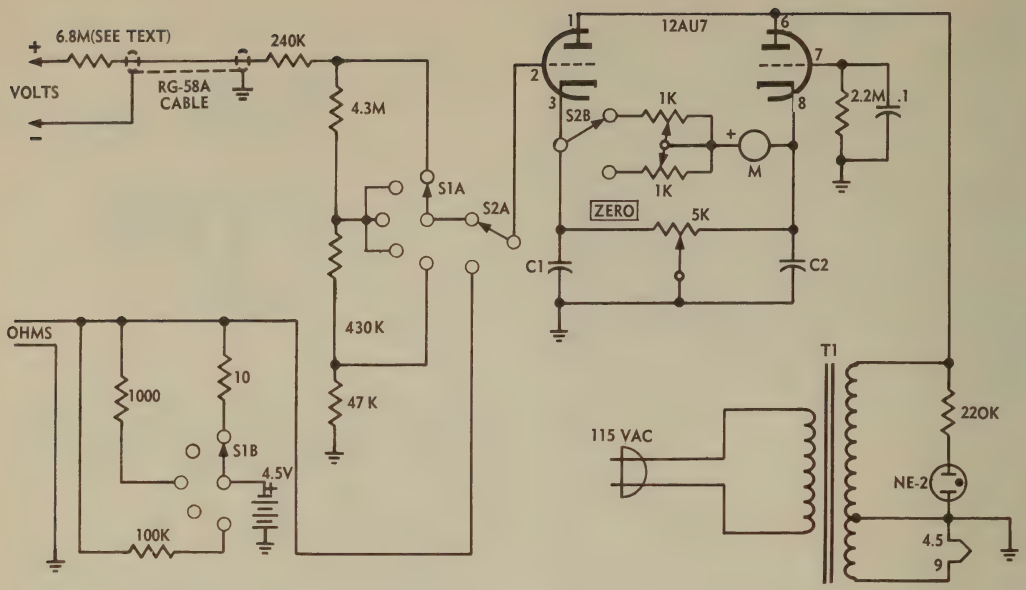
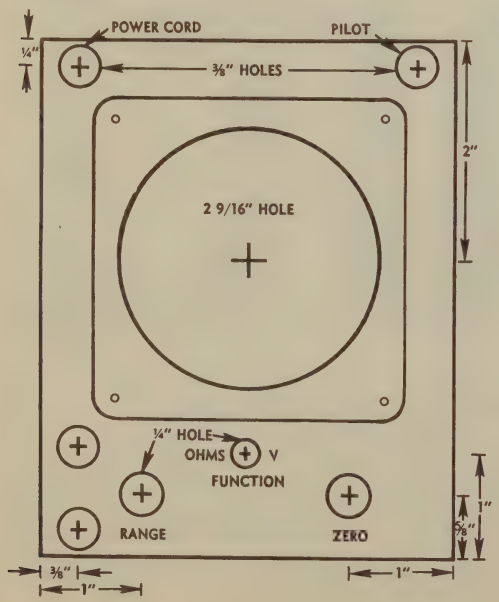


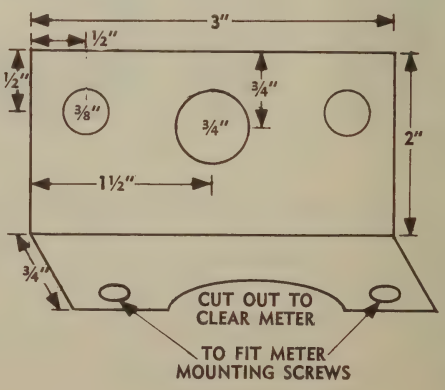
operation were covered in the July power meter article (part I of this series). If this is too much trouble, you can still use the instrument by noting the scale reading and determining ohms from Figure 3.

For instance, if you get a reading of .44 on the unmodified meter, this is the same as 4.4 volts—and a look at Figure 3 shows that 4.4 volts falls at the same place on the scale at 8 ohms. Whether the true value is 8, 800, or 8000 depends on the setting of the RANGE switch.



The next step is to mount the tube socket and the two 1,000-ohm pots on the subchassis as shown in the photos. Install the meter, transformer, DPDT switch, 5,000-ohm ZERO pot, and terminal strips in the chassis box, but do *not* install the RANGE switch yet. Leave the two lower nuts off the meter when you install it—they will be used to hold the subchassis in place later.

Put grommets in the four ⅜-inch holes in the chassis box. Push the NE-2 bulb through its grommet from the inside; it will stay there by friction. Now wire the AC line cord, pilot bulb circuit, and transformer primary (black wires) to the 3-terminal tie strip as shown in the schematic. No line switch is included; a VTVM should be left on at all times to assure calibration accuracy.

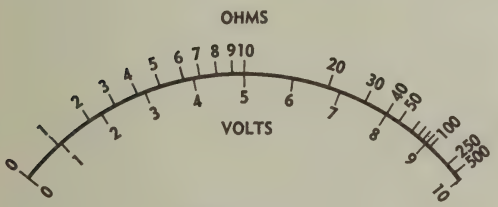


The next step is to wire the RANGE switch. This is done before installation since it goes into a mighty small spot. Details are shown in the photo and wiring should follow the schematic. Make *all* the RANGE switch connections at this point. For those connections which go to other parts of the circuit, put in 5-inch lengths of insulated wire. The other ends of the wires can be cut to proper length and connected after the switch is installed.

When the RANGE switch wiring is completed, install it in position.

Next step is to connect the two 50-mF capacitors to the two outside terminals of the ZERO pot. The other leads can be conveniently grounded by connecting them to the extreme end terminal of the 8-point tie strip and running a jumper from this terminal to the adjacent grounded terminal.

Now back to the subchassis. Connect the 0.1-mF capacitor and the 2.2-megohm resistor as shown in the photo and schematic, and also connect the transformer leads. One red lead connects to pins 1 and 6 of the tube; the other red lead goes to ground; one green lead



CBH VTVM

connects to pins 4 and 5; and the other green lead goes to pin 9. This completes subchassis wiring.

Next step is to wire the FUNCTION (DPDT) switch. Connect short (3-inch) lengths of bare wire to the two center terminals; these are the "arm" connections shown on the schematic. Connect longer lengths of insulated wire to the two outside terminals on one side (the side nearer the meter), and connect the leads from the RANGE switch to the other two outside ter-

(Continued Page 37)

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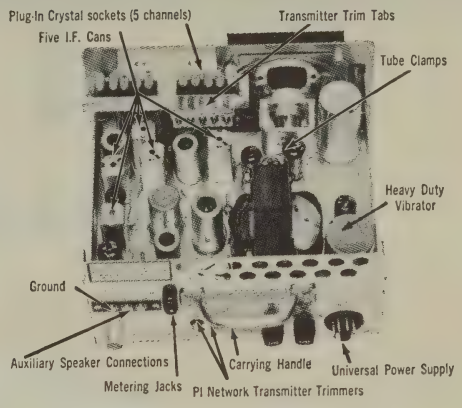

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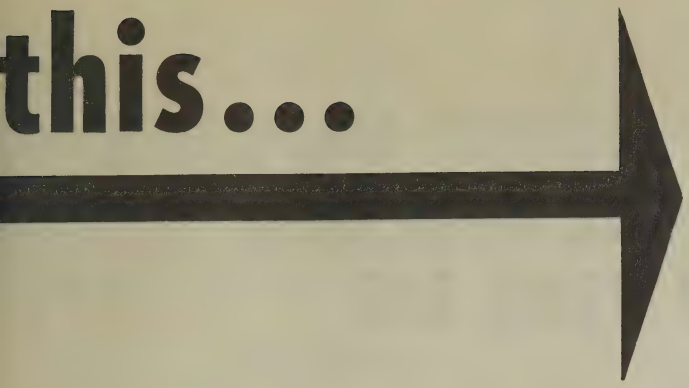

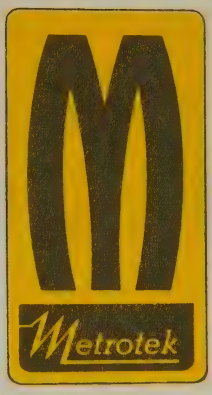

★ **Field Engineered:** Exhaustive field tests, improvements and more testing went into the Metrostar design. This transceiver is designed to take more hard use than you will ever give it!

★ **Protection Circuitry:** Electronic safeguards against damage from improper adjustment or crystal failure.

★ **Field Tuning:** Complete Pi-Network tuning and transmitter loading controls are located conveniently so you can peak your Metrostar to your particular antenna system for maximum efficiency in transmitting and receiving.

★ **System Engineered:** Tuning and receiver peaking is a cinch with the Metrostar combined functions "S" and "RF" meter. **Switch left** and you have a functional tune-up meter for transmit. **Switch right** and you have a relative signal strength meter.

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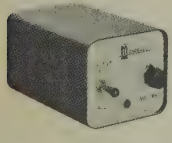

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ADD AUDIO AMPLIFIER COMPRESSOR TO YOUR RIG

— Staff —

Last month, we told you all about the theory of "shaping" audio in CB transmitters—the why and the how, in general terms.

We also promised you complete construction details on a do-it-yourself clipper and shaping unit.

Here they are.

This device was designed by David L. Cabaniss, 1W0802, of Terryville, Conn., and the first model was built for use with a Lafayette HE-20A. Later copies have been successfully used with the Heath GW-10 and the Gonset G-12. With proper adjustment of the output level control, it should perform admirably with any CB transceiver.

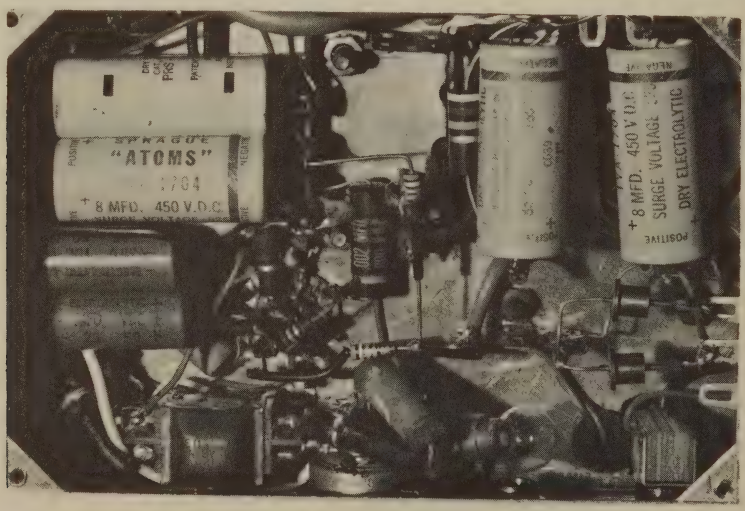
Total cost of all parts is about $20, Cabaniss advises. Construction time necessary will vary with your experience; this is a rather complex project, so take your time and triple-check each connection.

Start by gathering all parts (see the parts list for quantities and type numbers). Next, using the accompanying photographs as a guide, mark and cut the mounting holes for all components which attach to the chassis. Be sure to allow enough room between holes to accommodate the components (a common mistake is to place potentiometer holes 1/16-inch too close together).

Next, mount the transformer, chokes, and tube sockets in place. Attach the tie strips beneath the chassis as shown in the photo.

Now, wire the power supply and the tube-filament connections as shown in the schematic diagram.

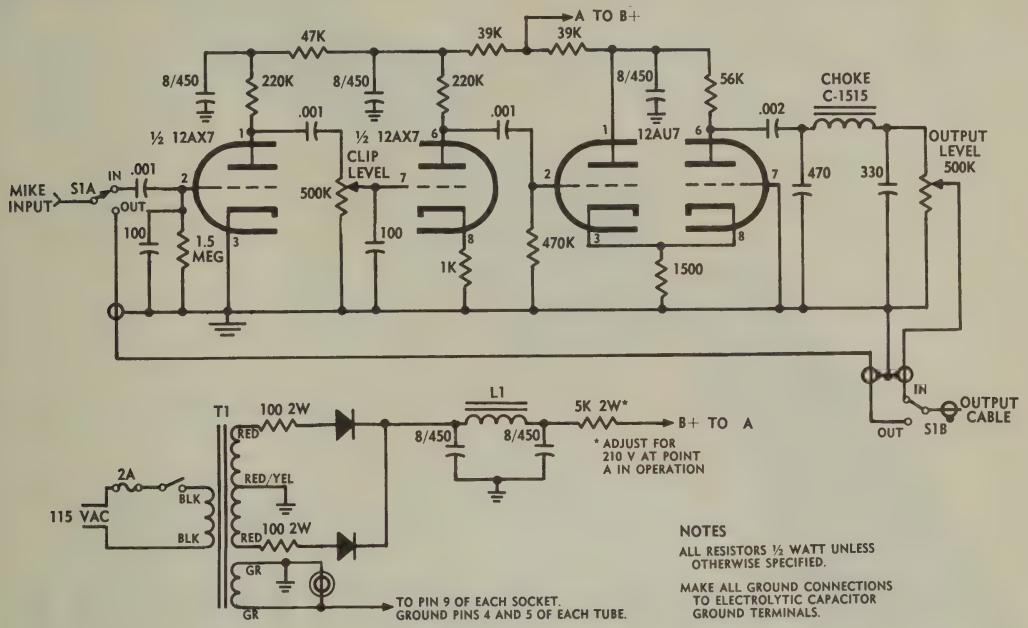
When the power-supply wiring is complete, connect the transformer pri-



Audio Amp and compressor. Power supply right bottom, choke left top, 12AX7 and 12AU7 tube sockets left front.

mary temporarily to 115-volt AC and measure the DC output voltage. If it measures about 200 volts (give or take 50 volts) all is well so far and you can continue wiring, if not, check the parts already wired.

Before proceeding with the wiring, short out the filter capacitors with an insulated screwdriver (disconnect the AC power first) to prevent a shock.



Now mount all controls and wire in all remaining components, following the schematic diagram and photographs. Use shielded wire for all audio leads (to grid or plate of any tube, as well as input and output) and try to keep these leads well away from the filament wiring.

When the wiring is finished, the unit should be checked out before hooking it to your transmitter. One way of doing this is to connect a pair of headphones to the output cable and have a friend talk into the microphone.

With both the chassis-mounted output level control and the front-panel clip level control set wide open, the friend's voice should come through loud and clear (though he might sound like he is in a rain barrel). Backing off with the *clip level* control should have *no* effect on the volume, *until* the control is almost all the way off. On the other hand, backing off on the *output level* control *should* reduce the volume *but* make no other change in the sound.

If the unit passes this test, you're ready to hook it up to your rig. Turn the *clip level* control all the way open and the *output level* control all the way off; then turn on the rig and the clipper and let them warm up.

(Continued Page 36)

A NEW STAR
OVER THE WEST!

ECS-METROSTAR
"Golden Transceiver"

A QUALITY TRANSCEIVER ON TERMS EVERYONE CAN AFFORD!

HERE IT IS . . . The opportunity you have been waiting for! You can own the fabulous new 1963 ECS-METROSTAR "Golden Transceiver" for only $16.00 down and payments as low as $10.56 per month. This is the first 8 channel (plus 23 tunable) transceiver to offer the CB'er all of the prime features of the more expensive sets for only $159.95! And ECS makes it available to every CB'er . . . on terms anyone can afford!

Only $16.00 Down! PAYMENTS AS LOW AS $10.56 Per Month!

ECS handles all of the details! Use the handy form below to order your ECS—Metrostar "Golden Transceiver" and be among the first to own one in your area. With the exclusive ECS—Metrostar plan, you pay for your transceivers and antennas as you use them. No large outlay of cash at one time. Step up to Metrostar 8 channel ease of operation, superb base or mobile communications today. Step up to Metrostar with the ECS—Metrostar "Golden Transceiver" from Electronic Communications Sales, Inc.

ELECTRONIC COMMUNICATIONS SALES, INC. has the new Metrostar transceiver in stock now—ready for immediate shipment. ECS is the exclusive supplier for all Metrostar transceivers, the new Monocall selective call and associated units throughout the Western states (all states west of the Mississippi). Dealers are now being established, so watch for an announcement here, listing your franchised area dealer.

IF YOU CAN'T WAIT . . . regardless of where in the U. S. you live (east or west) you can order the fabulous new Metrostar transceiver direct from ECS, on credit terms if you wish. And you'll be on the air with your new Metrostar in approximately a week or 10 days!

ECS Package Order Plans

BUY A SINGLE UNIT OR A COMPLETE SYSTEM!

PLAN NO. 1*

$16.00 Down, **$10.56** per month (15 mos.) for 1 Metrostar "Golden Transceiver".

PLAN NO. 2*

$16.99 Down, **$11.20** per month (15 mos.) for 1 Metrostar "Golden Transceiver", 1 top quality 48" name brand top-loaded fiberglass whip, body mount, and all inter-connecting coaxial cable. (A complete mobile station installation.)

PLAN NO. 3*

$19.76 Down, **$13.04** per month (15 mos.) for 1 Metrostar "Golden Transceiver" and 1 Model CBB-1 Mark Mobile "Beacon" ½ wave length base station antenna.

PLAN NO. 4*

$36.00 Down, **$23.75** per month (15 mos.) for 2 Metrostar "Golden Transceivers", 1 Model CBB-1 Mark Mobile "Beacon" base station antenna, 50' of RG 58A/U coaxial cable with SO-239 connectors on each end, and a complete 48" mobile antenna kit. A complete base and mobile 2-way system!

*SHIPPING COSTS & STATE TAXES NOT INCLUDED.

Special Plans: If you don't see what you need here in the way of mobile or base station packages—or if you need more than two units, write Department M outlining your needs. We will send you a quote by return mail exactly meeting your requirements.

ECS ELECTRONIC COMMUNICATIONS SALES, INC.
P. O. BOX 405—OKLAHOMA CITY 1, OKLAHOMA (phone CE 6-1581)

Enclosed my check or money order for $_____ covering my order for ECS — Metrostar Plan No. _____. I understand that my order is subject to standard credit approval, and that I am protected by the standard EIA 90 day warranty on my new ECS — Metrostar "Golden Transceiver".

Enclosed my check for $_____ covering payment in full for _____ Metrostar "Golden Transceiver (s)".

Name_____

Address_____

City & State_____

DEALERS—Franchise territories now forming.
Write for Information Today

See Insert Page 12 to Order Your Copy!

—CB Audio

Continued From 33

Switch the clipper "out" of the circuit, and contact one of your other units on the air. Explain the nature of your test to him, then switch to "in" and start a countdown while slowly adjusting the *output level* control. Keep a note of the number associated with each setting; the setting to use is the *last one before* your other unit reported "no increase in audio".

A better method of setting this control is with an oscilloscope and a tone generator, if you know a willing ham or service shop. However, the technique described here will give usable results.

The *clip level* control can be adjusted for the desired amount of clipping as described in last month's article. With this control all the way off, no audio passes through the unit. With it all the way on, clipping is at a maximum and you'll sound like you have a huge echo chamber around you. In between, you'll get varying amounts of clipping. At the lower settings of the control, you have very little clipping and consequently the unit does little to improve your audio. For most uses, you'll find a setting somewhere around the middle of the knob's rotation about right.

One caution when using the clipper: With this unit, background noises become almost as strong as your own voice, at the other end of the radio circuit. *Take care* that no horseplay in the background results in illegal messages going out over the air; this applies equally well to the TV set's sound in the next room, the table model radio in the kitchen, the kids running and shouting, and boisterous friends telling jokes!

However, with this one caution in mind, you'll find a judicious amount of clipping *can* increase your effective power as much as *10 times*—and you'll wonder how you ever got along without a clipper!

—jk—

Audio Compressor—Parts List

Capacitors:

- **2** 100 picofarad ceramic or mica
- **1** 330 picofarad mica
- **1** 470 picofarad mica
- **3** .001 microfarad 600-volt paper tubular
- **1** .002 microfarad 600-volt paper tubular
- **1** triple section 8/8/8 mF 450-volt electrolytic
- **1** dual section 8/8 mF 450-volt electrolytic

Resistors (all 1-watt composition unless otherwise specified):

- **1** 1000-ohm
- **1** 1500-ohm
- **2** 39,000-ohm
- **1** 47,000-ohm
- **1** 56,000-ohm
- **2** .22-megohm
- **1** .47-megohm
- **1** 1.5-megohm
- **2** 100 ohm 2 watts
- **1** 5000 ohm 2 watts
- **2** 500,000-ohm audio taper potentiometers

Inductors and transformers:

- **1** Stancor C-1515 (do not substitute)
- **L1** 8-henry 50-MA filter choke
- **T1** Power transformer, 115 VAC primary, 250 VAC C. T. 50 MA secondary, 6.3 VAC 2 A secondary.

Miscellaneous:

- **S1** DPDT rotary switch
- **1** SPST toggle switch (power)
- **1** 2-amp fuse and holder
- **1** pilot lamp assembly with 6.3-volt bulb
- **1** 12AU7 tube
- **1** 12AX7 tube
- **2** 9-pin tube sockets with shield base
- **2** tube shields to fit
- **1** input jack
- **1** shielded output cord
- **1** line cord
- **1** chassis box

hookup wire and solder as necessary

THE ULTIMATE HE-20 FEEDBACK

A number of readers have inquired about erratic S-meter action following conversion of the detector and noise limiter.

This is caused by a slightly unconventional AVC circuit; the detector modification changes S-meter action as a result.

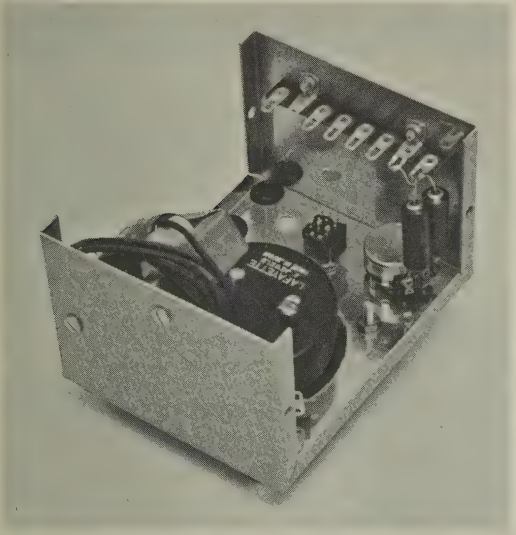
The AVC circuit can be converted to a standard one, and S-meter action consequently restored, by removing two 10-megohm (brown-black-blue) resistors. One of the resistors to be removed is the one labeled R7 on our original conversion schematic. The other was not shown; it is located about an inch and a half nearer the crystal sockets, and connects to an IF transformer.

Set performance was not affected by clipping out the resistors, except that afterwards it had slightly more gain.

minals. Run one wire from the center terminal nearest the meter to one outside terminal of the ZERO pot.

At this point, you can install the subchassis. It will take a bit of maneuvering to get the shafts of the calibration pots past the terminal strip, but it can be done. Don't tighten down the mounting nuts on the meter yet.

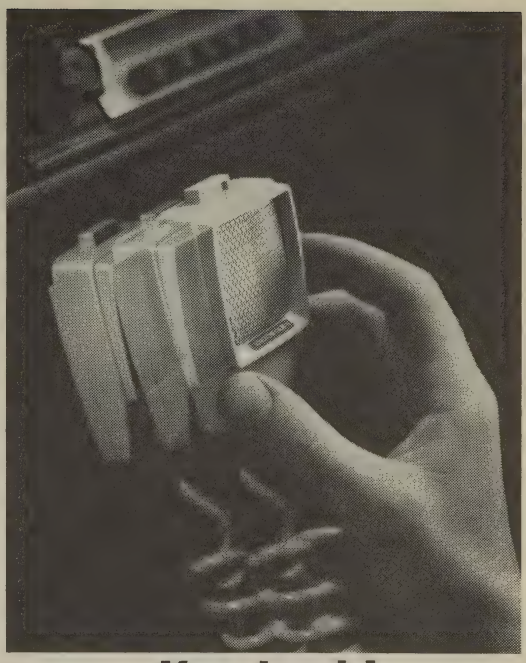
The next step is possibly the hardest of the whole job. Fish the wire from the DPDT switch center terminal *nearest* the subchassis up through the terminal from pin *3* of the tube socket, pull it tight, check that it isn't shorted to anything else, and solder it. Then do the same for the other center-terminal wire, connect to pin *2* of the socket.



PARTS LAYOUT—VTVM

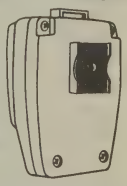
From here on in, it's a cinch. Connect the insulated wires from the DPDT switch outside terminals to the respective outside terminals of the cilibration pots. Connect the arm terminals and the inside terminals of the calibration pots all together, and run a lead to the meter terminal marked +. Run another lead from the meter terminal marked − to pin 8 of the tube socket, and from there to the ZERO pot outside terminal which does not already have a wire connected to it. Run a bare wire from the ZERO pot center terminal to ground.

(Continued Page 54)



Kerchunk!
new sound of safety

Kerchunk is the sound made by the heavy duty magnet on the back of a Sonotone CB Ceramike as it mounts firmly, securely to your car's dashboard.
Kerchunk says: "Message to base completed easily, safely."
Kerchunk means no more groping when you return your mike to its dashboard mounting bracket—no need to take your eyes off the road.
Responsible for this boon to those who rely on CB or mobile communication, from car or truck, is an important Sonotone development called "Magnet Mount." A heavy duty magnet on the back of Sonotone Ceramike mobile communications Models "CM-30M" and "CM-31M" lets you place the mike almost anywhere on or around the dashboard. Further, Magnet Mount eliminates the need to drill holes for dashboard mounting brackets.
Sonotone Ceramikes have far more to recommend them than just this amazing mounting device. The quality-engineered mobile communications models, "CM-30M" and "CM-31M" provide loud and clear reception. Inherently immune to extremes of temperature and humidity, they will operate even if immersed in water. Neoprene encased transducers render them shock and impact-proof.
CERAMIKE "CM-30M" — Intelligibility unsurpassed. High sensitivity from −49 db from 60 to 7000 cps. Lightweight, shatterproof plastic case. Convenient "Push-to-Talk" button. Spring-spiraled, 4-conductor shielded cable—list **$16.50** With dashboard mounting bracket instead of Magnet Mount. Model "CM-30"—list **$14.00**
CERAMIKE "CM-31M" — Budget-priced communications model in shatterproof plastic case features excellent intelligibility in 60 to 7000 cps at −49 db sensitivity. 2-conductor coil cable, no switch, list **$16.00.** With dashboard mounting bracket instead of "Magnet Mount." "CM-31"—list **$13.50**

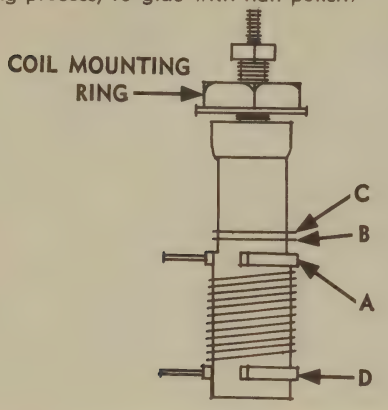


SEE SONOTONE CB CERAMIKES FEATURING MAGNET MOUNT
Sonotone® Corp. • Electronic Applications Div. • Elmsford, N. Y.
Cartridges • Speakers • Tape Heads • Mikes • Electron Tubes • Batteries • Hearing Aids

CB Pre-Amp

Continued From 10

from point A to coil form mounting ring. **Solder. Connect** a .001 ceramic capacitor from point D to pin 2 of tube socket. **Cut** the leads on a .00003 ceramic capacitor to ¼" lengths. **Connect** this capacitor from pin 2 to the tube socket mounting ring. **Solder. Connect** end B to J1 center post. **Solder.** (If glue holding coil form is loosened by soldering process, re-glue with nail polish)



— Take the remaining coil form and **wind** a 12 turn coil of #24 enamel. **Wind** a 2-turn coil on this form also. (Similar to above) **Cut** end B to ⅞" length. **Cut** end C to ⅜" length, **bend** down and **solder** to mounting ring. **Mount** coil form in 3/16" hole adjacent to pin 7 of tube socket. **Connect** point A to pin 7 of tube socket. **Connect** point D to left-hand side of meter M1 using a 3½" piece of #22 hookup wire. **Connect** a .001 ceramic capacitor from point D to coil form mounting ring. Also connect a .00003 ceramic capacitor from pin 7 to tube socket mounting ring. **Solder** all connections. **Connect** end B to J2. **Solder.** Unit is now ready to test.

TEST & ADJUSTMENT

Rotate RB1 control fully clockwise. Connect 5 ft. length of A.C. line cord, one lead to lower terminal of SW1 and other lead to tie point connection B. Plug tube in and turn SW1 on. After about 1 minute adjust RB1 until meter reads 30. *WARNING* When initially turning pre-amp on, be sure to watch meter. Meter should indicate zero until RB1 is adjusted. If it does not, turn unit off. Go back and check connections. OK, if the pre-amp checks out this far, you are ready to align it. First of all you will have to determine which type of CB unit you now have. If you have one with a built-in antenna relay, remove the connection to the receive side of the relay. Connect this lead thru a piece of co-ax cable to J2 on the pre-amp. Connect the receive side of the relay thru a piece of similar co-ax to J1 on the pre-amp. Adjust the slugs on both pre-amp coils for maximum signal. That's all there is to it. Now, if you have a CB unit which does not have an antenna relay, you will have to obtain and install a relay.* You cannot connect the pre-amp in series with the antenna co-ax as the transmitter will not work and you will probably burn up the tube. The best solution for this problem is to consult your local CB dealer for advice.

PROBLEMS

Some readers may experience difficulty obtaining the 7788 tube through local sources. Recent indications are that the tremendous demand created for this tube has caused some distributors of Amperex tubes to be out of stock.

Readers may obtain detailed information on the tube, and possibly a line on where or when the tube will be available in your locality, by writing directly to *Mr. M. Smoller, Amperex Electronics Corporation, 230 Duffy Avenue, Hicksville, L. I., New York.*

PARTS LIST

Obtain the following parts:

1—7788/E810F tube (Amperex)
1—5 ft., A.C. line cord
1—Power transformer (Stancor-PA-8421) or equivalent 125 VAC-50 ma. & 6.3 VAC-2 A.
1—Chassis—6¼" x 3½" x 2⅛" (LMB #138 box chassis)
1—Co-ax jack (Dow-Key #DK-60-P)
2—¼" slug-tuned coil forms (Miller-20A000RB1)
1—250 Ohm potentiometer
1—RF plug (Switchcraft #3507)
1—RF jack (Switchcraft #3505F)
1—Milliameter, 0-100 ma. scale, 1" case
1—250 Microfarad, 15 WVDC capacitor
2—400 volt PIV silicon rectifiers
1—100 Ohm, 1 watt resistor
1—47,000 Ohm, ½ watt resistor
1—27,000 Ohm, ½ watt resistor
1—9 pin miniature socket
1—1000 Ohm, 5 watt resistor
1—Switch, SPST
2—.001 Microfarad, stud-mounted capacitors (Sprague BH-140)
1—Dual 30 & 30 Microfarad capacitor, 150 WVDC

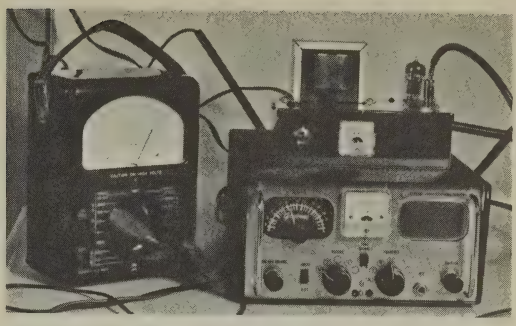
*Readers are referred to the September, 1961 issue of CB Horizons, page 38 (1 - Tube Pre-Amp for Receivers), and the April, 1962 issue, page 30 (Hooking Up Nuvistor Pre-Amps) for background material on installing the 7788 Pre-Amp in existing transceivers.

5—.001 ceramic capacitors
2—.00003 ceramic capacitors
1—4/40" bolt & nut, ¼"
3—⅜" rubber grommets
4—6/32" bolts, ¼" length
6—6/32" nuts (2 to hold the stud-mounted capacitors)
2—#6 Solder lugs
1—2 terminal tie point
1—Single terminal tie point
2'—#22 insulated hookup wire
2'—#24 enamel covered wire

7788 LAB TESTS

The 7788 CB Horizons Pre-Amp shown here is undergoing its 100th hour of air testing in the CBH lab. Test procedures included constant sampling of the pre-amp's ability to amplify weak signals not audible on the interconnected transceivers, and keep amplified background noise at a value not considered detrimental to the performance of the overall Pre-Amp plus transceiver system.

During lab testing, the 7788 unit shown here was interconnected as a receiving pre-amplifier ahead of the General MC-5 shown, a Hallicrafters CB-3, Browning R-2700A Base Station receiver, Tram TR-27, and a Lafayette HE-20A. "Very audible improvement" was the remark of the engineer conducting the test evaluation in each instance.



7788 in Test with MC-5

The 7788 unit installed at a base station of one of the Horizons' staff members for a weekend period provided reception in the S3 level from stations in Tulsa, Oklahoma over a ground wave circuit of 110 miles. The same modern transceiver, with Pre-Amp disconnected, could not copy stations further than 60 miles in a test employing instantaneous switching of the Pre-Amp in and out of the lead from the antenna.

10-7

BULLETIN: ***To those who prefer or require a shortened antenna!***

The Mileage Maker, Jr. AT 54" is the very best antenna for You!

Here's Why:

1. The conductor is in the center of the rod for maximum protection and durability
2. Center loading maximizes radiation resistance and efficiency
3. The whip material is reinforced fiber glass of continuous fiber construction.

All of which provides:

Improved signal to noise ratio (as much as 20db)
Increased operating gain and receiver sensitivity
FOR YOU this adds up to

AN EXTENDED, CLEAR OPERATING RANGE!

Order the Mileage Maker, Jr. today!

FG54CL	Mileage Maker, Jr.	List $15.85
FG102CL	Mileage Maker	List $18.95
LCF	Base loading coils for stainless whips	List $ 6.65

Enjoy better CB performance . . . visit your dealer or write

CREATIVE PRODUCTS INC.
6944 Plainfield Rd., Cincinnati 36, Ohio
Phone 791-0030

See Insert Page 12 to Order Your Copy!

CB News FROM WASHINGTON

RUMBLINGS

FCC officials at lower levels in the Land and Transportation Division are still hoping to have a completely revised Part 19 ready for presentation to the FCC seven man Commission early in October. At least two manufacturers have been told by officials in the FCC ". . . your model XXX unit may have been legal under the existing Part 19, but the new regulations are very clear in prohibiting your unit from usage in the Class D radio service."

The Commission is especially concerned with a number of attachments for CB transceivers including units which tie into the telephone lines (phone patches). The new Part 19 revisions also spell out what is and what is not permissible under Section 19.34-D, i.e. tone signaling and calling. The new regulations will make it clear that unless the tone calling unit attached to your transceiver electronically activates a squelch on the transceiver of a similarly equipped station, the tone calling attachment will be illegal. This means "Q-Birds" will probably be outlawed, although the more elaborate methods of tone-calling such as those now being manufactured by Heath, Metrotek, Johnson, and Miratel will be very much legal, and recommended.

A complete text of the major portions of the Part 19 proposals will be printed in CB Horizons and/or the monthly Call-Book Supplement as soon as they become available.

PETITION

George L. Turk, Jr. of Houston, Texas has filed a petition with the FCC asking that Part 19 rules be amended so as to require that Class D stations may communicate only with stations operating under the same call-sign.

Most observers believe that this type of rule making is unnecessary in light of the new Part 19 revisions which most certainly will tighten up "Permissible Communications" by other means.

LICENSE REVOKED

While the Commission continues to revoke a number of CB licensees every month, the reasons for their revocation do not continue to make news. CB Horizons feels that the fact that a CB operator has violated Part 19 does not in itself constitute news. We all hear too much of it every day on the air, 99.99 percent of which goes unnoticed by the FCC simply because the Commission's small staff cannot be every place at once.

Now and then an unusual revocation case does come to light.

A case to point is the revocation of a Class D license held by Robert Earl Cox of Compton, California (11Q0183). Mr. Cox had his license revoked, effective August 27, because he failed to respond satisfactorily to official notices concerning alleged violations of sections 19.33 (frequency diviation) and 19.61 (sub-

(Continued Page 43)

-CB- SHOWCASE

NEW CB PRODUCTS OF THE MONTH

A new CB transceiver from **Metrotek Electronics, P.O. Box 9591, Raleigh, North Carolina** is now appearing on the CB scene. Dubbed the "Metrostar Transceiver," the unit features 8 crystal controlled transmit and receive channels and a tunable 23 channel double conversion receiver.

The unit also features relay-less electronic TR switching, and is described by the manufacturer as "conservatively rated at 5 watts input." A built-in AC/DC power supply, combined "S" and RF meter, noise limiter and squelch add to the functions of the unit. It is equally suited for either mobile or fixed station use.

Metrostar Transceiver

Metrotek Electronics has also announced a new selective call system known as the "Monocall" unit. The Monocall is designed to be used as an accessory with existing two-way radio systems. Combining reliability with moderate cost, Monocall represents a two-tone concept in CB selective calling. The manufacturer states that "multiple burst tone coding and computer type logic decoding prevents false triggering of the selective calling unit." Up to six code combinations are possible with any one unit or a total of 72 different code combinations possible by using the 12 variations of the tone calling unit available. Monocall is supplied in two units . . . as an Encoder/Decoder at $59.95 or as an Encoder only for $29.95.

The **Heath Company, Benton Harbor, Michigan** has combined their new 4 position selective tone-calling unit (see release below) and a new 5 channel deluxe CB transceiver into a single package. Heath is announcing their new GW-22 and GW-32 transceivers. The company describes the units as "ideal for fleet owners and industrial commercial users of CB radio."

The units feature 5 crystal controlled transmit-receive channels, superhetrodyne receiver with RF stage for increased sensitivity, built-in squelch and noise limiter functions, push-to-talk circuitry. The GW-32 models feature built-in selective tone squelch. This permits one unit to use selective call and signal up to four separate units on the same channel, without alerting the other three!

GW-32 Transceiver

The GW-22 series starts at $59.95, while the GW-32 series (with selective call) starts at $84.95. Both prices are for kit models, while both are also available as wired units.

Complete information is available from Heath, Benton Harbor, Michigan.

Heath's new four channel selective calling unit combines the features of quiet channel operation with four call versatility into a single accessory unit that is easily adapted to most existing CB transceivers. Connected to your transceiver, the unit operates as a speaker switch that is controlled by a resonant reed relay. The receiver speaker is disconnected at all times (for complete silence) until actuated by a selected tone of sufficient intensity and duration to trip

GD-162 Tone Squelch

the relay. The relay then connects the speaker for a few seconds for you to hear the call letters of the sender, and then it returns to silent position. If the call is for you, just lift the microphone from its switched clip (this disables the

See Insert Page 12 to Order Your Copy!

tone squelch) and carry on a normal conversation. Other features include a 0-10 second relay "hold" control, a defeat switch or normal operation, input and output level controls, and terminal strip contacts for connection of an external alarm device such as a buzzer or bell. One GD-162 selective call unit connected to each of your transceivers provides the privacy of a private line.

The model GD-162A is the AC version. It sells for $33.95. Model GD-162A is the DC unit. It sell for $37.95.

Sonar Radio Corporation, 73 Wortman Avenue, Brooklyn 7, New York has announced a new ruggedized 8 channel (crystal control on transmit and receive) CB transceiver. Named the "Model G," the new unit features a double conversion receiver, tunable receiver for all 23 channels, high level class "B" modulation, "S" meter and transmitter tuning meter, adjustable squelch, crystal spotting switch and illuminated panel.

Sonar Model G

The unit incorporates a heavy-duty two-way power supply and is constructed from lightweight aluminum. The new light unit weighs in at just 9 pounds, carries a one-year guarantee, and arrives with one set of crystals and a high-impedance microphone. Price is $229.50.

The **Antenna Specialists Company, 12435 Euclid Avenue, Cleveland 6, Ohio,** has a new look in Fiberglass CB antennas that makes real sense. Dubbed the "Black Beauties," AS/P has incorporated a new tube sleeving process known as **Thermofit PVC** into the M-52, M-53, and M-58 antenna models. The new baking process insures that the fiberglass antennas retain better elasticity and are more resistant to abrasion. The new process also insures that the antennas will not become brittle with age. The antennas are still 48 inches long, although they are center-loaded now. See your AS/P dealer. He has the full story.

Another new innovation on the CB mobile antenna market this month comes from **B & K Dynascan Corporation, 1801 West Belle Plaine Avenue, Chicago 13, Illinois.** Two new Mark Heliwhips (r) are currently available at Mark antenna dealers. One unit is called the HWC (cowl mounting) antenna while the second goes under the name HWR-42, for roof top mounting. The HWC unit resembles and is directly interchangeable with standard auto broadcast antennas. A CBC-1 Accessory Coupler permits the single antenna to be used for both CB and standard AM radios. The antenna is constructed of fiberglass and has Mark Static Sheath plastic covering.

Top-loaded, the 50-ohm load antenna design permits a shorter mechanical structure and assures proper ground plane performance. The HWC is available in three models, an 18 inch, 36 inch and 48 inch model. The HWR-42 roof-top CB antenna is similar in design to the HWC unit except for its mounting. It is 42 inches long. Net prices on the antennas are $9.95 for the HWC and $14.95 for the HWR-42.

Further information is available from B & K.

Electronic Associates, P.O. Box 155, Summerville, S.C. has a new gadget that will probably appeal to the 102 inch mobile whip user. Tagged the "Tune-It-Unit," this accessory consists of a specially threaded piece of aluminum tubing which screws down into your spring mount where the 102 inch whip normally goes. Next you drop the whip itself down into the top portion of the Tune-It-Unit and tighten the nut shown. Obviously, by now, you have a "whip-plus-extension-rod" that is more than 102 inches long.

Next you follow the instructions and trim the whip a little at a time until you find just the right combination of whip plus extension which resonates your whip on the CB frequency in use. The Tune-It-Unit is a handy way to peak your 102 inch whip . . . most of which really require more than 102 inches in length to perform at peak efficiency. The Tune-It-Unit is a practical solution to this problem. Price is $2.95 from the manufacturer.

TEXAS CRYSTALS CHANGES HANDS

On August 1 the Whitehall Electronics Corporation of Minneapolis acquired the Texas Crystals Division of Westronix Corporation. Texas Crystals, which moved its entire plant from River Grove, Illinois to Ft. Myers, Florida three years ago, is a large manufacturer of Citizens Band crystals. The firm recently announced the manufacture of the 1,000,000th CB crystal since the Class D radio service was created in 1958.

No changes will take place with Texas Crystals' sales representatives or 1600 distributors.

INTERNATIONAL POWER KIT

International Crystal Mfg. Co., 18 N. Lee, Oklahoma City, Oklahoma has announced a new transistor power conversion kit for all Executive Citizens Banders transceivers manufactured by the company. The power supply kit replaces the standard vibrator supply found in all Executive transceivers prior to the firm's 100-A series, which includes the transistor supply as standard equipment now. International points to the longer lifetime of the new solid state power supply as a reason for making the conversion. The kits are available at most International dealers for $12.50 each, plus a recommended installation charge of $5.00.

SONAR HAS CB FILM

Sonar Radio Corporation, 73 Wortman Avenue, Brooklyn 7, New York has a new sound-on-film 8 mm movie available for showing at CB club meetings. The 7 minute film is in short supply and large demand at present, and interested CB clubs are urged to schedule its showing only **after** making the proper arrangements with Sonar.

—Washington Continued

stantive communications). In reply to a show-cause order (a show-cause order is an official inquiry from the FCC which demands to know why the CB license should not be revoked, in light of certain alleged violations), Mr. Cox told the FCC "I do not desire a FCC hearing and have no objection to a license revocation as I am no longer using CB radio."

CB MICROWAVE?

Washington and industry circles are puzzled by a proposal unwrapped by the FCC in July which would allocate "frequencies above 16,000 megacycles for point-to-point microwave relay" in the Citizens Radio Service.

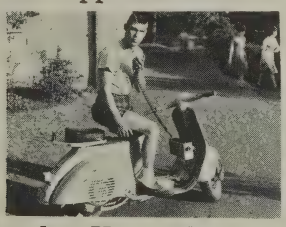
Up to this time no point-to-point microwave frequencies have been alloted to the CB service. It is generally believed that the new proposed allocations would affect only Class A "UHF" CB users who desire to tie together remotely located 450-470 megacycle radio links via microwave.

Comments on the proposal are due by October 1.

R. N. Adams

EE IN CB

At the University of South Carolina CB'er 5Q0815 set out to prove that all Electrical Engineering students are not so wrapped up in formulas and slide rules as to forget the practical side of life. So he evolved a formula of his own for practical application of his studies.



The formula; *Vespa Motorscooter + 1 Cadre 500 transistorized transceiver + 15 volts of battery power + 1 Stinger 32 inch antenna* ='s 1 high performance and very handy CB mobile rig.

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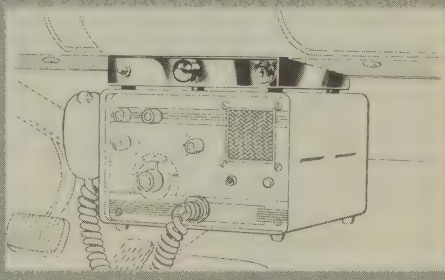

A functional mounting rack that enhances the looks of a car . . . is so sturdy that it is virtually a part of the dashboard . . . is quickly and easily mounted . . . allows fast removal of the rig . . . is virtually tamper proof and will fit nearly any type of rig to almost any car.
Rig-Loc is a specially designed rack that fits snug and flush under the dash, or in special instances to the transmission hump. It has a built-in lock that allows the unit to slide forward or backwards to lock in place, or for instantaneous removal. Also available is an easy-vision panel light for tuning.

Rig-Loc locks in place . . . discourages theft
Rig-Loc . . . simple, easy installation
Rig-Loc . . . quickly removed for repair or switching from car to boat, base operations, home, etc.

GUARANTEE

Rig-Loc is unconditionally guaranteed to perform to factory claims and for workmanship and quality of material.

Model "A" . . . Mounts Sonar, Executive, Webster, Eico, Ray-Tel, Globe, Citi-Fone, Poly-Com, Apelco, Kaar, General, Browning, Mobilaire . . . $12.95.
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Model "C" . . . Mounts Gonset, Johnson, Viking, Eico, Gonset Super 12 converter, FM converters, Johnson ham units . . . $12.95.

Order by model number or send in make of unit. Check or money order . . . no C.O.D.
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The CBH Lab Reports . . .

WE TEST

★ Metrostar Transceiver

The Metrostar 8 channel crystal controlled (transmit and receive) plus 23 channel tunable transceiver has undergone nearly 30 days of lab tests as this is written. Our conclusion? At the $149.-95 price tag, this transceiver offers a wealth of features normally found only in more expensive units, and performance that is hardly indicated by its modest price tag.

With our conclusions out of the way, let's see what makes this transceiver a good buy.

In the feature department, the Metrostar's 8 channels for transmit and receive put it in the "multi-channel" class without a doubt. The tunable receiver employs a gentle action variable tuning rate that makes signal spotting a cinch even in a mobile. You are first impressed by the unit's sensitivity. Under *no ignition noise* conditions we found that 0.5 uV of signal provided 10 db of signal to noise ratio. The audio recoverability rate even with heavy ignition interference is very good. Though the unit does not employ an adjustable noise limiter, the method used for detecting the signal through the squelch circuit gives the user a very good performing receiver that is affected only slightly by ignition noise. In other words, you can copy signals that many other transceivers leave way down in the mud.

The receiver itself is a double conversion design providing adequate selectivity for crowded band conditions. A transceiver operating on channel 11 (using a popular speech amplifier system) with its antenna only five feet away from the antenna tied to the Metrostar transceiver produced barely audible hash on channel 9 on the Metrostar.

Design buffs will find a number of interesting features in the schematic of the Metrostar. For example, electronic TR switching is used to move the antenna from transceiver to receiver. This means the grid of the 6AU6 receiver rf amplifier tube is tied directly into the same line as the output from the transmitter. What keeps the receiver from popping the 6AU6 on transmit? The AGC line buss goes all the way to the suppressor grid on the 6AU6 cutting the tube off completely on transmitt. This has another distinct advantage, in addition to the fact that no relays are needed. The receiver is now biased in such a way that it is *absolutely impossible* to overload it even when working from mobile to mobile at parallel parking distances!

Metrostar under test. Elenco 12 vdc speech compressor also under test—same time!

The Metrostar utilizes a heavy duty power supply (vibrator) mounted on an equally heavy duty chassis. The receiver, transmitter and audio circuitry mounts on a printed circuit board 3/32 of an inch thick. Our first impression with the printed circuit board was "Oh-oh . . . here comes trouble." However, despite the best beating Oklahoma roads could give it in 30 days, the board has shown no signs of weakening. Since the board itself absorbs most of the shock of mobile operation, the component parts mounted on it actually get less jarring than with transceivers using the more standard metal chassis plates. The printed circuit board has a special fiberglass support layer which contributes to its strength. Our conclusion about the printed circuit board is simply this. As it is employed in the Metrostar unit, it offers no disadvantages over other forms of component mounting. Through circuit board use the people at Metrostar have been able to reduce the cost of the unit, passing the savings along to the CB'er.

The transmitter uses 13 megacycle crystals, doubling in the 6CL8 oscillator. The final amplifier tube is a 6GK6, a heavy duty version of the popular 6GM5 used in several transceivers. The 6GW8 modulator is capable of full 100 percent modulation. Power output, measured on two units-1 installed in a mobile and the other installed at base in the Horizons Lab, varied somewhat. The mobile unit showed 4.9 watts input and 2.9 watts output. The base unit measured at 4.5 watts input and 2.6 watts output.

The Metrostar uses dual (two) power cords for either 12 vdc or 117 vac operation. Moving from the mobile to the base is simplified with a two-knob mount which attaches under the auto dash in standard fashion. Pi network output also affords the opportunity for the user to peak the unit to the antenna.

All Metrostar units have an accessory plug on the back panel which allows direct plug-in of the new Monocall selective call unit. No internal or external wiring connections or changes are necessary. We will cover a review of the Monocall in November.

One of the quality items apparent in the Metrostar is the Electo-Voice 714SR microphone. It detaches from the front of the unit through a standard connector.

The meter shown on the front is a standard dual purpose device, measuring relative transmitter power, and, receiver signal strength.

Access to the crystals is through a small door on the bottom of the case. Changing or adding crystals is a matter of 60 seconds time.

The new Metrostar transceiver is manufactured by Metrotek, Inc., a North Carolina firm with a good history in specialized communication systems. The unit is the firm's first for the CB field. You may inquire further into this unit by writing Metrotek at P.O. Box 9591, Raleigh, North Carolina.

CB and Side Band— Continued

lower sideband, the carrier, and the upper sideband. (Diagram 4A). By eliminating the carrier and the lower sideband, and still maintaining our power input to 5 watts, we have all of that power to put into our single remaining sideband (Diagram 4B). In other words we aren't wasting power by spreading it over an extra sideband that is merely duplicating what we are saying on the first sideband anyhow!

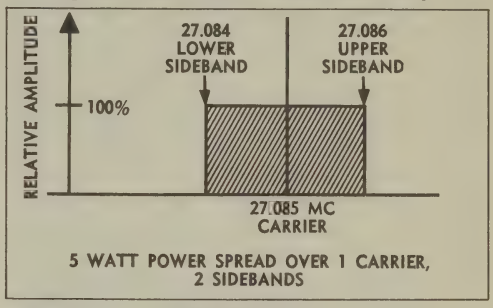

Diagram 4A

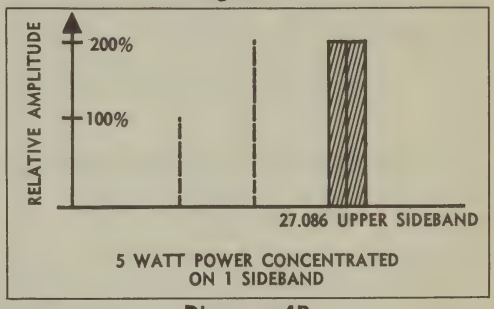

Diagram 4B

Next we enter into another area of discussion that gets a little involved for the newcomer. It concerns power measurement methods. On sideband we measure our power a little differently than we do on AM. With our AM carrier, we simply turn on the transmitter and measure our power output.

On sideband we have no power output unless we are talking or feeding some type of audio signal into the transmitter. This means that everytime we say "Hello-test" our power output meter bounces up and down like the S-meter on a transceiver which has a loose antenna connection. On "Hello . . . " the output jumps from nothing (no voice-no output, remember) to some value on the scale. Between "Hello . . . " and "test" there is a pause. So the transmitter output

also pauses. It shuts down, completely, until the word "test" comes from our lips. In these two words the meter also hits various peaks within the individual words where we accent or add voice inflections to a particular letter or syllable. Diagram 5 illustrates how a typical power output meter reacts as we say the short phrase "Hello . . . test."

Obviously, over a 10-20 word sentence, the transmitter output is going to go up and down tens of times. So what do we measure . . . the peak power hit on the meter when we accent heaviest on our longest word? Or do we measure the power output between words (zero output)? The answer is neither. We measure the average of the two.

This means that for any given sentence or transmission we will have "peak power" considerably above our average power. By math, it figures out to be twice (2x) the average power.

Remember our 5 watts? That was our *average* power. Our *peak* power is now 10 watts.

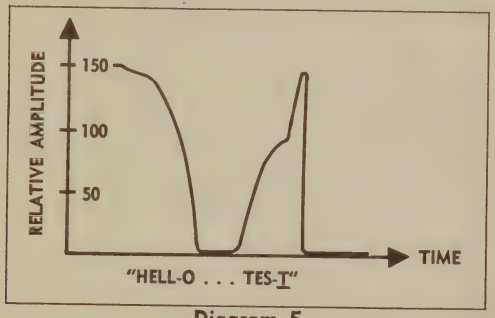

Diagram 5

All of this is by way of explanation for those who were wondering where the 9 db came from. The same 9 db advantage that we gained when we filtered out the carrier and one of our sidebands on our AM transmitter, and ended up with single sideband.

WHAT GOOD IS 9 DB?

Unless you are familiar with signal measurement techniques, the phrase "9 db gain" probably means little, if anything.

The science of measurement of levels is an exacting one. Engineers know, through agreed upon principles, that when a signal doubles in strength, that increase in level can be detected by the human ear. This is the *smallest* change that the average human ear can detect however. In other words, if you double the amount of signal you are putting in at a distant receiver, the listener will detect that change in level as an audible improvement in your signal level. This "doubling" will require that you double something at your transmitter. Either double your transmitter power, add an appropriate amount of antenna gain, or something similar.

You will recall that we mentioned in the opening of this report that 9 db of signal increase was the same as using 8 times as much power. Eight times the power is like doubling once (1 plus 1 equals 2), doubling again (two plus two equals 4) and then finally doubling once again (four plus four equals 8).

Engineers measure a doubling of signal level as "3 db signal improvement." Thus doubling 3 times (from 1 to 8) is actually the same as 3 times 3 db, or 9 db. We have made three *progressive* increases in the minimum detectable amount of audible signal change over our first signal level.

That is 9 db.

OPERATING ADVANTAGES OF SSB

As this is a several part series (although not planned for consecutive months, entirely) we will save the discussion of what happens to the single sideband signal at the receiver until next installment.

We do feel that you should be left with some practical answers as to the advantages and disadvantages SSB can and will provide in everyday operating in the Class D radio service.

That same 9 db we were just discussing gets prominence in our advantages section. Nine db "circuit gain" (i.e. the extra signal level we can expect using SSB at 5 watts average power as opposed to AM at 5 watts carrier power) can be very important in the fringe of your present coverage area. If you are currently experiencing 10 mile base-to-mobile coverage, where it is a weakening signal level and *not* ignition noise that drowns the signal at the 10 mile point, that extra 9 db of effective signal will add from 5 to 8 miles to your base-to-mobile range. Not quite double, but almost double your present range. The same ratios

can be applied to any circuit distance you are now working. For example, spot your base on a road map of your area. Draw a circle of your coverage radius surrounding your base station. Now measure the distance on a line from your base station to your furthest regular mobile or base contact point. On this same line, extend it by 50 to 75 percent, and then draw a new "SSB coverage radius" using the new extended distance.

Using this simple technique you can quickly see of what fringe-area coverage value SSB would be to you. If you have mobiles operating frequently outside your present coverage area but within the new expanded coverage area, than SSB would probably be a worthwhile investment on your part, *when* it becomes available.

If you don't care to talk out any further than you now are doing, then stick with AM for a while yet.

Other than gain, SSB offers an additional advantage or two. First of all, let's go way back in this discussion to our point we made about "filtering out the carrier." With the carrier gone, there is no constant signal on the air. Only when we are actually talking is there a signal present, and then only during word syllables. Even between syllables of words there is dead space. So much so that it can easily be shown that if you will read the following sentence out loud, as fast as *you* can read it and a *listener* can still understand what you have said, you will have something more than 50% "dead-air-time" just between words and syllables! The sentence? Take any sentence—such as "The lazy brown dog jumped over the quick red fox."

With the carrier gone, all we have is intelligence—i.e. words (we'll overlook the wisecracks here about all words not being intelligent!).

Think back now to the last time you heard two stations on the same channel at once. You also heard a "squeal" or shrill whine, at the same time. This high pitched whine was caused by the two carrier signals from the AM transmitters trying to occupy the same place in your receiver at the same time. It simply can't be done! This, coupled with the fact that the odds are some-

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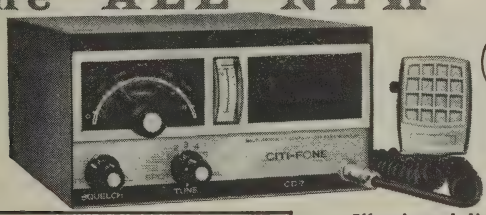

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SPECIFICATIONS

RECEIVER: Tuned R. F. amplifier—Two (2) I. F. amplifiers—"noise-immune" squelch—Automatic noise limiter—5 position crystal controlled and 23 channel tunable coverage—Sensitivity: ½ microvolt for 6 DB signal to noise ratio.
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CURRENT CONSUMPTION:
5.5 amps at 6 volts DC input
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35 watts at 115 VAC input
MODEL CD-7/6—6 volt DC & 115 VAC
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Either style supplied with cords for AC and DC operation.
SIZE: 9" wide x 10" deep x 4¾" high.
SHIP. WT.: 15 lbs.
PRICE:
$189.50 Complete with crystals for 1 channel, 2 power cords, and microphone with coiled cord and hanger.

- Illuminated dial scale. Vernier tuning with 4:1 ratio.
- Dual function "S" meter is calibrated in "S" units to 9 with plus 20 and 40 DB graduations. A 50 microvolt signal at antenna terminal will register S9 on the meter. In transmit, the meter indicates relative power output.
- Front panel function switch features instant choice of crystal controlled receive, tunable receive and crystal "spot" position. The "spot" position permits locating on the dial, the transmit crystal frequencies installed within the Citi-fone.
- A new high in transmitting efficiency is obtained by optimum R. F. drive, circuit design in the power amplifier and a HI-Q tank coil. Resonance of the circuit is adjustable and is tuned to the antenna by observing the panel meter.
- The off/on switch, volume control and squelch are combined in dual controls. The squelch is of the steep operating "noise-immune" type designed to open on a .1 microvolt signal change at threshold setting.
- Jack connector for optional headphone or remote speaker reception.

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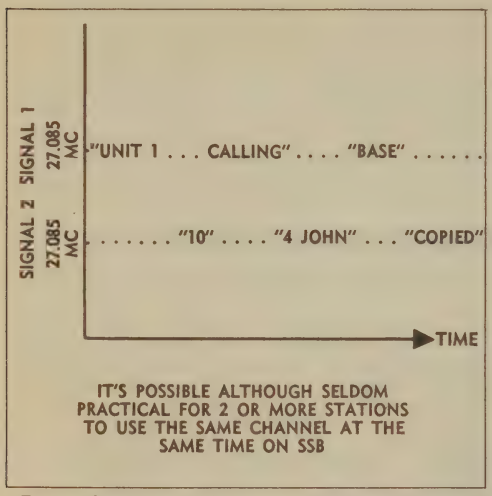
thing like 100,000 to 1 that the two transmitters you were listening to were actually *not* on the same frequency (FCC rules say they may deviate up to .005 percent from the assigned channel frequency), produced the shrill whine. The difference between the two carrier frequencies may only have been a matter of 200, 400 or even 800 cycles. But that difference, when the two signals were mixed together in your receiver, was a shrill note of 200, 400, or 800 cycles per second (or at some other random note frequency between 20 cycles and possibly 4,000 cycles). This was a beat note. So called because two signals were "beating together" (mixing) in your receiver.

There are no beat notes in sideband. Because there are no carriers to *beat* . . . that's why!

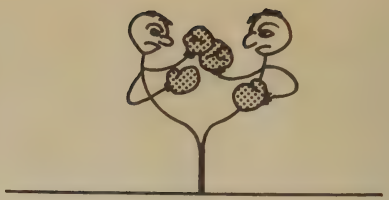


IT'S POSSIBLE ALTHOUGH SELDOM PRACTICAL FOR 2 OR MORE STATIONS TO USE THE SAME CHANNEL AT THE SAME TIME ON SSB

In other words, on sideband it is conceivable (although seldom practical) for two or more conversations to be going on at once on a channel. It is the beat note of two or more AM carriers trying to be at the same spot at once that covers up the audio intelligence on an AM signal . . . not the audio intelligence of one covering up the audio intelligence of the other.

In its most practical form the absence of "beat notes" means greater ease of operation simply because the ear splitting whines are gone.

This also means that even though a strong station is on the channel on sideband, you can hear a weak station calling (you) and become aware that



"TWO AM CARRIERS SIMPLY CAN'T OCCUPY THE SAME FREQUENCY IN YOUR RECEIVER AT THE SAME TIME"

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WE HOPE . . .

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Learning to use sideband will be like learning to talk all over again. It will be quicker to transact your radio business because sideband is less prone to

(Continued Page 57)

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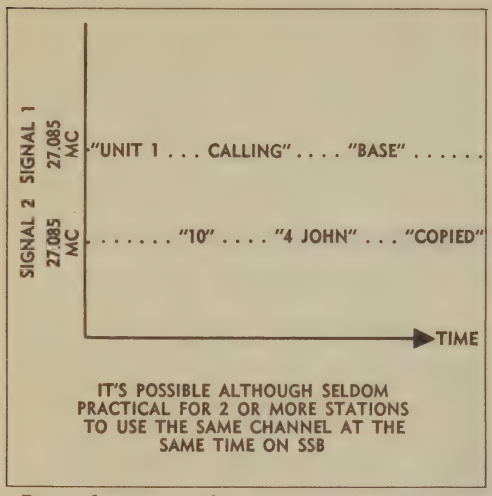

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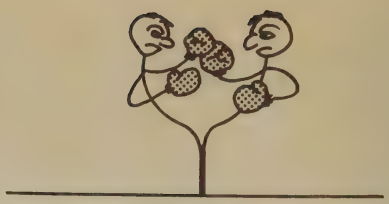

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27.035 Mc	7	7
27.055 Mc	8	8
27.065 Mc	9	9
27.075 Mc	10	10
27.085 Mc	11	11
27.105 Mc	12	12
27.115 Mc	13	13
27.125 Mc	14	14
27.135 Mc	15	15
27.155 Mc	16	16
27.165 Mc	17	17
27.175 Mc	18	18
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USE THIS CARD TO ORDER LARGE 17 by 22 inch two color CB Transceiver Trouble Shooting Chart.

*Remove this card from the magazine, fill in the reverse side, and attach your check or money order for $1.00, place in envelope.

*Mail to: CB Trouble Shooting Chart
P.O. Box 1557
Oklahoma City 1, Oklahoma

CB DEALER CARDS

GIL SEVERNS WHOLESALE ELECTRONICS

40400 E. Florida, Hemet, Calif.

We stock ECI-Courier, Johnson, Eico, AS/P, Newtronics, Hi-Gain, Cushcraft and Webster. 11W0802 on channels 9, 11 and 16. Open 6 days per week.

L. A. DINGMAN RADIO-TV SERVICE

P.O. Box 407, Lake Placid, Florida

Stop by and see our complete line of CB transceivers, antennas and accessories. Get off to a good start by outfitting with L. A. Dingman!

ARROW SALES, INC.

7035 Laurel Canyon, North Hollywood, California

We stock Hallicrafters transceivers. Antennas—AS/P and Hy-Gain. Our call is 11W7153 on channel 11 and we are open 9-9 six days per week, Sundays 10-4.

MARTIN ELECTRONICS

6103 W. Ridgewood Avenue, Orlando, Fla.

We stock Browning, Hammarlund, Gonset, Transcendor, Webster and Kaar transceivers. Also, AS/P antennas, Webster antennas, Noistop, James Knights crystals. 6W5420 and we monitor "Natch-9" from 8 AM to 9 PM.

PENINSULA ELECTRONIC SUPPLY, INC.

656 South First Street, San Jose, Calif.

We stock Kaar-D-Phones, Johnson Messenger. Antennas—AS/P and Newtronics. Our call is KFC0669 on channel 11. Open six days per week.

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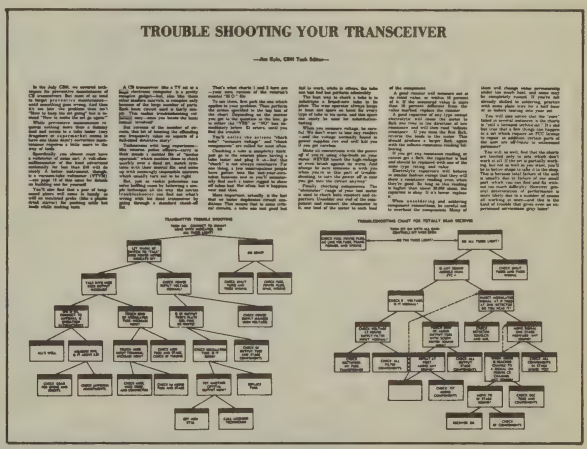
We stock General, RCA, Johnson, Globe, Eico, Pan-Com transceivers. Also, Hy-Gain, AS/P, Webster, Newtronics and Mark Mobile antennas. 19W1721 monitors channel 12 for calls. Open six days per week, Wed. night to 9.

HERE IT IS!

THE HANDIEST CB WALL CHART SINCE THE CALL-AREA MAP!

CB TRANSCEIVER TROUBLE SHOOTING CHART


TROUBLE SHOOTING YOUR TRANSCEIVER

Hundreds of readers have written asking for this special chart. Last month's September CB Horizons carried a special 3 page article entitled "Trouble Shooting Your Transceiver." Now available in big 17" x 22" two-color wall chart form, this article included two very-very handy Trouble Shooting Charts for transceiver receivers, and transmitters. With this big 17 by 22 chart on your wall, you can quickly and easily locate trouble spots in your transceivers. Limited quantity available. Use the handy order card to the left of this announcement to order your 17 by 22 two-color Trouble Shooting Chart!

USE HANDY ORDER CARD

Price: $1.00 Each, postpaid

See Insert Page 12 to Order Your Copy!

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321 E. Main Street, Sedalia, Mo.

We stock RCA, Gonset, Johnson and Globe transceivers. Antennas—Hy-Gain and AS/P. 17W1626 stands by on channel 11, 8 AM to 5 PM weekdays, 8 AM to noon on Saturday.

10-4 CB CENTER

139 Ewingville Road, Trenton 8, N. J.

We stock the ECI-Courier 1 and Hallmark transceivers. AS/P and Newtronics antennas, and all accessory lines. KBG1540 stands by on channel 11 six days per week.

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2533-65th Street, Brooklyn 4, N. Y.

We stock Gonset, Hallicrafters and Sonar transceivers. Antennas—AS/P and Newtronics. 2A4403 stands by on channels 3 and 6 from 9 AM to 7 PM. Come by and see us!

LIFETIME ELECTRONICS INC.

1501 Adams Street, Toledo, Ohio

We stock E. F. Johnson, Hallicrafters, LaSalle and Eico transceivers. We also stock Master Mobile, Hi-Par and Newtronics antennas. 19Q9268 is our call, and we are open 8:30 to 5:30 Monday through Saturday.

TELE COMM ELECTRONICS

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We stock Globe, Cadre, Paco units. Sales and service for you! Also, modifications, frequency checks. FCC licensed technician on duty. 9Q0362 stands by on channel 11 from 8:30 to 5:30. Stop by and see us!

Attention dealers! Contact Dept. MM for information on how you can participate in the "New CB'er Education Program" at *CB Horizons, P. O. Box 1557, Oklahoma City 1, Oklahoma.*

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CITIZENS BAND

CRYSTALS

Transmit or Receive ..... **4.25** each

Specify Equipment & Channel

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Pa. Residents Add 4% Tax.

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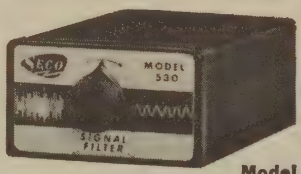

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ONLY $15.88 NET

- **A SECO PLUS—smallest, most rugged noise limiter and controllable squelch on the market**
- **Increases your reception range**
- **Electronically clips noise pulses out of your signal**
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- **Effectively eliminates ignition interference from passing vehicles**
- **Adapts to most CB transceivers using tubes—all AM superheterodyne receivers with 6 or 12 volts AC or DC and 150 volts "B" power supply—mobile or base station**
- **Styled to make a handsome matching set with the Seco Model 540 "S" Meter**

See your electronics distributor or use coupon below to order your Signal Filter.

SECO ELECTRONICS, INC.
1207 S. Clover Drive, Minneapolis 20, Minn.

Please send (Qty) _____ Signal Filters postpaid
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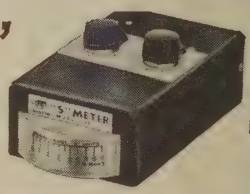
NAME_____

ADDRESS_____

CITY_____ STATE_____

this "S" Meter



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1207 S. Clover Drive, Minneapolis 20, Minn.

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PRINT NAME_____

ADDRESS_____

CITY_____ STATE_____

GROVE CB SALE ORDER BLANK!!!

COMMAND CB GOLDEN BEAM

3-Element Beam—Com-Gold Treated For Extra Power—Com-Gold Treated To Prevent Rust And Corrosion—Fights Off The Rusty, Salty Coat Of Weather To Deliver Top Performance!

☐ **MODEL GB-3** **LIST—$50.00** **SALE PRICE $19.95**

☐ **TRIUMPH 'WALKIE TALKIES'** 9-transistor deluxe unit, leather case, etc. SALE **$29.99**

☐ **UTICA TRANSCEIVERS** (Town & Country) **CLOSE OUT PRICE** (Reg. $180) **$119.95**

☐ **JAMES KNIGHTS CB CRYSTALS** (Specify make, model and channel) SALE **$1.99**

☐ **HY-GAIN COLINEAR CLR ANTENNA + FREE BONUS!** ONLY **$29.95** 100 ft. RG58 foam coax cable

☐ **SPEAKEASY** (audio comp. amp.) **+ FREE BONUS!** ONLY **$34.75** Command channel selector

☐ **NOISTOP** by Business Radio Co. **+ FREE BONUS!** ONLY **$16.95** Command channel selector

☐ **"S" MASTER** by Business Radio **+ FREE BONUS!** ONLY **$9.95** Tuneable GNS generator filter

☐ **"PATCH-A-CALL"** by Business Radio **+ FREE BONUS!** ONLY **$64.95** "S" MASTER by Business Radio

☐ **TRANSICHECK** by CESCO **+ FREE BONUS!** ONLY **$19.95** Command channel selector

☐ **SECO TRANS. "S" METER (#450) + FREE BONUS!** ONLY **$13.88** 50 ft. RG58 foam coax cable

☐ **NOISQUELCH** by COMMAND. twin squelch eliminates noise from your car and other cars around you. SALE (Reg. $16.95) **$10.99**

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☐ **COMMAND CONTACT 11** stainless steel spring & 102" whip + chrome body mount SALE (Reg. $12) **$6.89**

GET THAT SIGNAL OUT WITH ULTRA-LO-LOSS FOAM COAX CABLE!!!

☐	50 ft.—RG58u Coax Cable	SALE	$2.49
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☐ **BEACON ANTENNA** by MARK **+ FREE BONUS!** ONLY **$21.95** 100 ft.—RG58u foam coax cable

☐ **SUPER BEACON** by MARK **+ FREE BONUS!** ONLY **$36.95** 50 ft.—RG8u foam coax cable

☐ **MARINE HELIWHIP** by MARK (HW-11-6M) **+ FREE BONUS!** ONLY **$22.95** Command channel selector

☐ **SIGNAL FILTER** by SECO **+ FREE BONUS!** ONLY **$15.88** Command channel selector

☐ **ANTENNA TESTER** by SECO (#520) **+ FREE BONUS!** ONLY **$42.95** Command CB Silencer Kit

☐ **CB LOW PASS FILTERS** ONLY (Reg. $5) **$2.95**

☐ **CERAMIC CRYSTAL SOCKETS** SALE 10 for **89¢**

☐ **PL-259 COAX CONNECTORS** 39c each 10 for **$3.50**

☐ **SO-239 COAX CONNECTORS** 39c each 10 for **$3.50**

☐ **UG-175 ADAPTORS** 14c each 10 for **$1.19**

Closing out our stock of CB kits. Originally advertised at $39.95 up. Complete with power supply, tubes, crystal, cabinet, wire instructions, etc. Less microphone. Note: transmitter must be tuned and tested by or under supervision of person holding a first or second-class FCC license. All sales final at this price. Thousands now in use. Rush your order in today while the supply lasts.

☐ **110 Volt CB Transceiver Kits** **$19.95**

☐ **12 Volt CB Transceiver Kits** **$22.95**

☐ **6 Volt CB Transceiver Kits** **$22.95**

Check items wanted. Return ad or order with check or money order. Include postage, excess refunded. 50c service charge on orders under $5.00. Beams and 102" whips shipped Railway Express. 50% deposit on C.O.D.'s

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☐ Rush items checked
☐ Send FREE catalog of giant CB Values

Name.....
(please print)

Address.....

City.....Zone....State.....

See Insert Page 12 to Order Your Copy!

VTVM— Continued From 37

You still have left over four leads from the RANGE switch. Connect the grounded one of these to the grounded terminal of the 8-point tie strip nearest the switch, and the other three to the adjacent insulated terminals.

Now you're ready to put together the DC VOLTS test probe. Take the length of RG-58A cable and carefully remove the outside vinyl insulation for about 6 inches. Don't cut the braid, but trim it back about half an inch from the free end. Connect the center conductor to one lead of the 6.8-megohm resistor, then pass resistor and all through the handle of the test probe. Connect the other lead of the resistor to the test probe itself, then pull everything back and tighten the metal test-probe fitting into place in the handle.

Remove the tip plugs from the ends of the red and black test leads, and cut about 8 inches of wire from the free end of the black lead. Strip both ends of this short length of black wire; wrap one end around the bare shield of the RG-58A and put an alligator clip on the other end.

Now pass the RG-58A through the DC VOLTS grommeted hole, and connect it to the proper terminals on the tie strip (see schematic). Pass the free ends of the red and black test leads through the other hole and connect them to their tie-strip terminals.

Ground one end of the battery-holder and run a flexible lead from the other end to the battery terminal on the tie strip. Insert the 3 penlite cells so that the negative side is grounded and the positive side connects to the tie strip. Tighten down all mounting hardware that may still be loose, insert the 12AU7 into the socket, and construction is complete.

Now for calibration. Start by calibrating the DC VOLTS ranges. Set the RANGE switch to LOW, and plug the VTVM line cord in. The neon pilot should come on; if not, unplug the instrument and check all wiring.

After a few seconds, the meter needle should deflect. Adjustment of the ZERO pot should move the needle. Short the alligator clip to the DC test probe and adjust for a meter reading of zero.

Next, connect the DC test probe to the positive terminal of a *good* 9-volt

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with SPEAKEASY !

mobile or base

AUDIO COMPRESSOR AMPLIFIER

$34.75 wired

$24.95 kit

Increases copying range
Boosts total average modulation
Improves audio quality
Cuts through QRM/QRN
Fits all popular CB sets

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transistor-radio battery. The meter should deflect to the right—it may easily go offscale at first. If it fails to deflect, switch the FUNCTION switch (you may have the ohms and volts ranges reversed in hookup).

When you obtain a deflection, adjust the calibration pots. Which one is the VOLTS adjustment must be determined by trial and error. Your objective is to get an indication of 8.3 on the meter; if initial deflection is less than this, your calibration resistance must be decreased. If more, the resistance must be made greater.

Once you get a reading of 8.3 with a fresh 9-volt battery, and zero with the leads shorted together, the voltage calibration is complete. Switch to OHMS.

In this position, calibration is much simpler. Short the leads and zero the meter. Then separate the leads and adjust the OHMS calibration pot for full-scale meter indication. That's all there is to it.

You will find that the ZERO pot must be re-adjusted every time you switch functions or ranges. This is normal. In addition, on the LOW voltage range (0-10) you will find that you get a slight reading with the leads disconnected and lying loose. This too is normal; the meter will read properly when any voltage is applied. Grasping the test probe with your hand will send the meter off-scale on the low range—this is because of the high input impedance of the instrument. Your body acts like an antenna, picking up 60-cycle AC from the house or shop wiring, and enough voltage exists to send the needle off-scale!

CBH VTVM PARTS LIST

Resistors (½ watt 5 percent)

1 6.8 megohm
1 2.2 megohm
1 220K
1 100K
1 10K
1 1000
1 100
1 10
1 47K
1 430K
1 4.3 megohm
1 240K

Variable Resistors (IRC Type Q or similar)

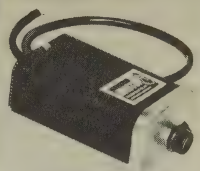
2 1000-ohm linear taper
1 5000-ohm linear taper

Capacitors

1 .1 mf 200 V paper

(**Continued Page 57**)

NEW!



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Only 1½"x 2½"x 4"

"NOISTOP" ELIMINATES IGNITION INTERFERENCE CAUSED BY NEARBY CARS AND TRUCKS... boosts range and performance by letting you hear signals normally lost due to ignition interference!

Thousands in use by CB'ers throughout the country! Prevents receiver jamming from trucks, cars, outboard motors, or other nearby source of pulse-type electrical noise! No need to suppress your car—ideal for base station use. Completely wired, tested and guaranteed. Installs in 20 minutes.

$16.95 NET

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ELMAC CD-5	KNIGHT C-27
GENERAL MC-4	LAFAYETTE HE-15A,20-A
GLOBE CB-100, 200	POLYCOMM PC-2
GONSET G-12, 14	RAYTHEON TWR-1
HALLICRAFTERS CB-2, 3	R. C. A. MARK VII
HEATHKIT GW-10	UTICA MC-27
INTL. CRYSTAL 50, 100	VOCALINE ED-27M
JOHNSON "Messenger"	WEBSTER 4-11

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BUSINESS RADIO CO. INC.

P. O. Box 5652 • Mpls. 17, Minn.

For Maximum Range . . . it's the New MAC-67

"GUT-R MOUNT"

NOW! A Completely Retractable CB Antenna Mount designed for Optimum Gain and Coverage. Mounts at car roof level . . . with No Holes in Car Top!

Pat. Pending

Attach the GUT-R MOUNT quickly and easily to your car's rain gutter. Any standard ⅜-24 thread whip mounts in just seconds! (Requires no drilling in car top!)

RETRACTABLE—at a touch of your hand. **LOCKS** positively in position — even at high speeds. **RUGGED** steel and aluminum construction. **YEARS** of superior service! **ORDER TODAY!**

See your local dealer or distributor **$9.95**

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McCULLOUGH CORP.

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Rates for classifieds are 10c per word for advertising which, in our opinion, is obviously of a non-commercial nature. A charge of 25c per word is made to all commercial advertisers or business organizations. We do not bill for advertising in CLASSIFIEDS, nor can we acknowledge receipt of copy sent in. Full remittance MUST accompany all orders. NOTE: The products and services advertised in this section are not guaranteed by the publisher of CB HORIZONS. Closing date for the November issue is Sept. 23rd, in Oklahoma City.

HEATHKIT OWNERS! DOUBLE RECEPTION! SK-4 Preselector mounts inside GW-12. SK-3 Preselector inconspicuously mounts outside GW-10, GW-11. Either kit, $8.99; wired, $11.99. DP-2 coupler-duplexer (for all mobiles) eliminates separate broadcast antenna; kit, $4.99. Postpaid! Kit list free! HOLSTROM ELECTRONICS, Box 8640, Sacramento 22, California.

QSL CARDS—Many sharp cartoon designs . . . send for FREE brochure. F. B. MATHEWS: PRINTING & ADVERTISING, 1616 Rural Street, Rockford, Illinois.

2x3 FCC WARNING DECAL against unauthorized use. 35c, 4/$1.00 C. B. PRODUCTS, Box 457, Encino, California.

CUSTOM-STOCK, MULTICOLOR QSL's. Fastest airmail service. Samples 25c (refundable). DUNNAHOO, 516 Prospect, Fairview, Massachusetts.

STREAMLINE YOUR INTERNATIONAL EXECUTIVE 50 or 100 model. Install the new 23 channel switch, completely wired. Takes but five minutes to install. $19.95 F.O.B. factory. See your dealer or place your order direct to C.B.S. ELECTRONICS, P.O. Box 110, Redwood City, California. Dealer inquiries invited.

CBL's—Colorful rainbo calls, space age, comic. Samples 25c (deductible). C. Fritz, Box 1684, Scottsdale, Arizona.

CB QSL CARDS—Free samples. Paul, 7701 Tisdale, Austin, Texas.

CB'ers DUAL CONVERSION ADAPTER KIT, all parts, schematic, pictorial; hear only the channel you tune. HE-15, A; TR-800, 910; etc. $14.95, with tubes $16.95. HE-20, A, B, C; Mark VII; 770, 1, 2; Messenger; $15.50, with tubes $17.50. HE-15B; 910B; GW-10; $15.75, with tubes $17.75, or $5.00 deposit plus C.O.D. Bainbridge Radio, 2649 Bainbridge Ave., New York 58, N.Y.

PROSPECTIVE HAMS MUST—OUTDOORSMEN and BOATERS should-know the Morse alphabet. Have fun memorizing it in one hour with "MEMORIZING THE MORSE ALPHABET." Send $1.00 for your copy to B. G. Munyan (KBG-2390), 200 Park Avenue, Harrison, N.Y.

YOUR CALL, name and address on rubber stamp. $1.00. W6LXW, P.O. Box 278, Capitola, California.

CB-QSL CARDS—BROWNIE W3CJI/3W1974 3110C Lehigh—Allentown, Pa. Catalogue with samples 25c.

TOUGH DOGS? CB'ers send your service problems to us—OLD COLONY TV & COMMUNICATIONS, 678 Old Colony Road, Meridian, Connecticut. FCC licensed technicians—free estimates.

WANTED—Johnson 12 volt Messenger—I'll pay cash—"Jacomar," 7701 Walnut, Kansas City 14, Missouri.

COME ON LIKE "GANGBUSTERS." CB modulator from any audio amplifier. Simple instructions and special transformer $4.95, postpaid. C&R Labs, Box 1284, Bell, California.

EXECUTIVE INTERNATIONAL 100; like new, Turner 350, '4 transmit xtals, Vanguard RF booster, instructions, $120. Will ship C.O.D. G. K. Locas, 8420 51 Avenue, Elmhurst, New York.

NEED CB QSL CARDS? Fast service, 200 for $5.00. Postpaid. Send 25c for samples and 50c coupon. McCartneys, Freedom, Indiana.

149.50 List

HALLMARK 2-12 CB

12 CHANNELS, CRYSTAL CONTROLLED
DUAL POWER • ULTRA-SENSITIVE SQUELCH

This precision-engineered transceiver comes complete, ready for fixed or mobile operation. Featuring sensitivity to better than 0.3μv for 10 db signal to noise ratio with selectivity better than 30 db, the result is a unit of very high reliability and performance. An illuminated "S" meter and push-to-talk operation are standard.

WRITE FOR ADDITIONAL INFORMATION

HALLMARK INSTRUMENTS DIVISION
TEXAS RESEARCH & ELECTRONIC CORP.
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DEALER INQUIRIES INVITED

SSB— Continued

many forms of interference and weak signal level problems that AM is. We feel confident that the advent of sideband to CB will do a great deal towards removing trash from the airwaves, if for no other reason than the simple fact that if you have nothing to say . . . it becomes painfully obvious to all listening and waiting for the channel that you are not engaged in substantial communications.

And if you have nothing to say, your transmitter is silent; so the channel is clear, for someone else to use.

The day of the dead carrier will become a thing of the past because the carrier is *dead* before it ever leaves the transmitter!

10-7

VTVM— Continued

2 50 mf 25 V electrolytic

Switches

1 2-pole 5-pos rotary (Lafayette Type SW-78)
1 DPDT Subminiature toggle (Lafayette Type SW-76)

Misc:

1 0-1 MA 3-inch Milliammeter (Lafayette Type TM-60)
1 3x4x5 Box Chassis (Premier PMC-1005 or similar)
1 12AU7 tube
1 9-pin socket
3 Penlite cells
1 3-cell penlite cell holder
1 NE-2 Neon bulb
4 rubber grommets for ⅜-inch hole
3 ft RG-58A coax cable
8 ft POSJ-18 "zip cord" line cord
2 red test probes
2 black insulated-handle ground clips
1 transformer, (Stancor No. PS 8415 or similar)
2 Knobs (Lafayette Type KN-59 or similar)

Sonar Appoints Epps of Canada

Sonar Radio Corporation, 73 Wortman Avenue, Brooklyn 7, New York has appointed Epps of Canada, 86 Chatham Street West, Windsor, Ontario as their distributor.

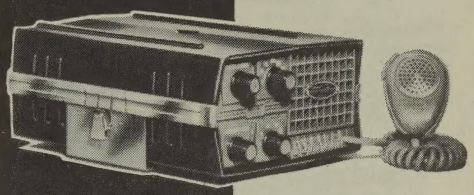
NEW CB LITERATURE

Shure Brothers, Inc., Evanston, Illinois is offering CB radio enthusiasts a specially printed card which shows the most popular and useful "10 series codes" for Class D radio use.

The cards are printed on heavy, glossy stock suitable for mounting. The cards are available for ten cents each from "Sales Department, Shure Brothers, Inc., 222 Hartrey Avenue, Evanston, Illinois."

WORLD FAMOUS PEARCE-SIMPSON QUALITY

THE COMPANION



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- Pre-set automatic noise limiter
- Superior squelch circuit
- Two antenna connectors to match any standard antenna
- Pre-tuned and crystal controlled for simple operation

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RUN — DON'T WALK
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JAMES KNIGHTS
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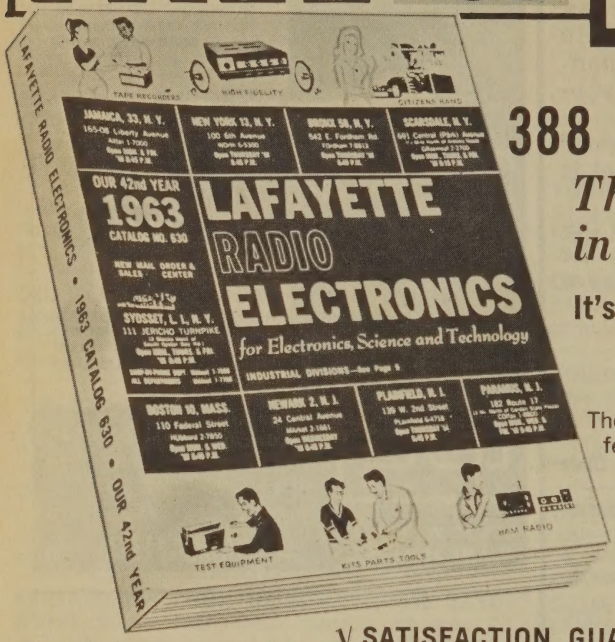

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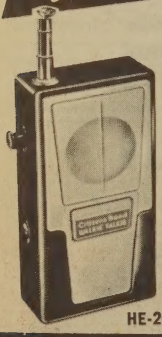

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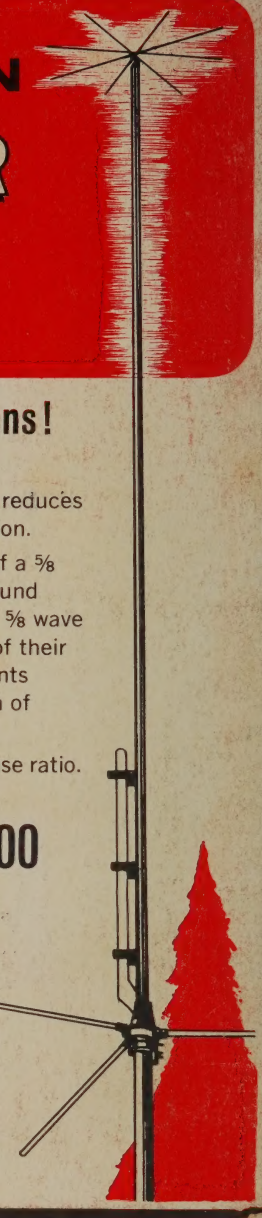
Iridite-treated Ground Plane Model GCLR for Citizens Band

The only C.B. gain antenna built to rigid commercial specs



Doubles effective radiated power in all directions!

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